



## CLAIMS

(canceled)

31. (new) A method for the organic synthesis of a molecule, in homogeneous phase, comprising converting an organic function of an onium salt, said onium salt being functionalized by at least one of said organic function and being used as a soluble support, in the presence of at least one organic solvent, said onium salt allowing the release of the synthesized molecule,

said onium salt being presented in liquid or solid form at ambient temperature, and corresponding to the formula  $A_1^+$ ,  $X_1^-$ ,

in which: –  $A_1^+$  represents a cation,

–  $X_1^-$  represents an anion,

$A_1^+$  being a functional or polyfunctional cation, and/or

$X_1^-$  being a functional or polyfunctional anion,

the onium salt being such that in its initial form, i.e. before the first conversion of said organic function,  $A_1^+$  and  $X_1^-$  are not bound together by a covalent bond,

and when the anion and the cation respectively carry an organic function, these cannot react with each other before the first conversion of said organic function.

32. (new) The method according to claim 31, characterized in that the onium salt is purified and/or recycled in its initial form after the release of the synthesized molecule.

33. (new) The method according to claim 31, characterized in that the functional cations and anions correspond to an ionic entity, cationic  $Y^+$  and anionic  $Z^-$  respectively, optionally bound by means of an arm, L and M respectively, in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms, to at least one function  $F_i$  and  $F'_i$  respectively,  $F_i$  varying from  $F_0$  to  $F_n$ ,  $F'_i$  varying from  $F'_0$  to  $F'_n$ , n being an integer varying from 1 to 10,

the functional cation  $A_1^+$  being able to be represented in the form  $Y^+-L-F_i$ , and

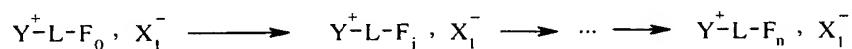
the functional anion  $X_1^-$  in the form  $Z^--(M)_k-F'_i$ , k being equal to 0 or 1.

34. (new) The method according to claim 31, characterized in that the organic functions  $F_i$  and  $F'_i$  are chosen from the standard functions of organic chemistry, such as the hydroxyl functions, carboxylic acid, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, phosphine (primary, secondary or tertiary), azide, imine, ketene, cumulene, heterocumulene, thiol, thioether, sulphoxide, phosphorated groups, heterocycles, sulphonic acid, silane, stannane or functional aryl.

35. (new) The method according to claim 31, characterized in that the molecular weight of the functionalized onium salt is less than  $1500 \text{ g.mol}^{-1}$ , in particular less than  $750 \text{ g.mol}^{-1}$ , and is preferably comprised from 130 to  $500 \text{ g.mol}^{-1}$ .

36. (new) The method according to claim 31, characterized in that  $A_1^+$  is a functional cation and in that  $X_1^-$  is a non-functional anion.

37. (new) The method according to claim 31, characterized in that  $A_1^+$  is a functional cation and in that  $X_1^-$  is a non-functional anion, and in which the onium salt  $A_1^+, X_1^-$  has as its initial form  $Y^+L-F_0, X_1^-$ , for obtaining a molecule G, comprising converting said initial function  $F_0$  according to the diagram



L representing an arm, and being in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms,

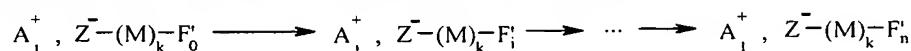
said molecule G being obtained by cleavage of the function  $F_n$ ,  
and the functionalized onium salt being able to be recovered or recycled in its initial form  $Y^+L-F_0, X_1^-$ , after the release of G.

38. (new) The method according to claim 31, characterized in that the functional cation  $A_1^+$  is chosen from the pyridinium, imidazolium, ammonium, phosphonium or sulphonium cations, cyclic or non-cyclic, substituted or non-substituted, and preferably ammonium or phosphonium.

**39. (new)** The method according to claim 31, characterized in that  $A_1^+$  is a functional cation and is chosen from the quaternary ammonium cations, cyclic or non-cyclic.

5                  **40. (new)** The method according to claim 31, characterized in that  $X_1^-$  is a functional anion and  $A_1^+$  is a non-functional cation.

**41. (new)** The method according to claim 31, characterized in that  $X_1^-$  is a functional anion and  $A_1^+$  is a non-functional cation, and in which the onium salt  $A_1^+, X_1^-$  has as its initial form  $A_1^+, Z^-(M)_k-F'_0$ , for obtaining a molecule G, comprising converting said initial function  $F'_0$  according to the diagram



$k$  being 0 or 1, and

M representing an arm, being in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms,

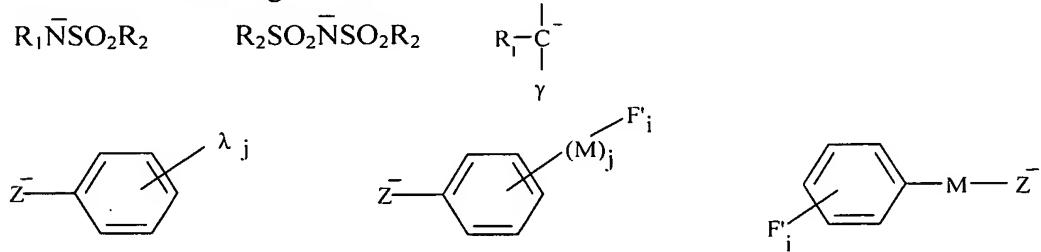
said molecule G being obtained by cleavage of the function F' n,

and the functionalized onium salt being able to be recovered or recycled in its initial form  $A_1^+, Z^--(M)_k-F'_0$ , after the release of G.

20       **42. (new)** The method according to claim 31, characterized in that  $X_1^-$  is a functional anion and  $A_1^+$  is a non-functional cation, characterized in that  $X_1^-$  is chosen from:

- the family of the phosphates:  $R_1PO_4^{2-}$ ,  $R_1R_2PO_4^-$ ,
  - the family of the sulphates:  $R_1SO_4^-$ ,
  - the family of the sulphonates:  $R_1SO_3^-$ ,
  - the family of the carboxylates:  $R_1CO_2^-$ ,

or from the following anions:



5            $Z^-$  representing an anionic entity, optionally bound by means of an arm M, in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms, to at least one function  $F'_i$ ,  $F'_i$  varying from  $F'_0$  to  $F'_{10}$ , n being an integer varying from 1 to 10, said functional anion  $X_1^-$  being able to be represented in the form  $Z^--(M)_k-F'_i$ , k being equal to 0 or 1,

10            $Z^-$  representing in particular  $O^-$ ,  $SO_3^-$ ,  $CO_2^-$ ,  $R_1PO_3^-$  or  $R_1PO_2^-$ ,

15           j representing an integer comprised from 1 to 5,

10            $R_1$  and  $R_2$  being able to represent independently of one another a functional alkyl group, a vinyl or alkynyl group, optionally functional, comprising from 1 to 20 carbon atoms, or being able to represent a functional aryl group comprising from 6 to 30 carbon atoms,

15            $\gamma$  and  $\lambda$  representing an electroattractive group, in particular chosen from the groups:  $CO_2R'$ ,  $SO_2R'$ ,  $CN$ ,  $NO_2$ ,  $P(O)(OR')_2$ ,  $C(O)R'$  and  $SO_3R'$ ,

15            $R'$  representing an alkyl group, optionally functional, comprising from 1 to 20 carbon atoms, or an aryl group, optionally functional, comprising from 6 to 30 carbon atoms.

20           **43. (new)** The method according to claim 31, characterized in that  $A_1^+$  is a functional cation and  $X_1^-$  is a functional anion.

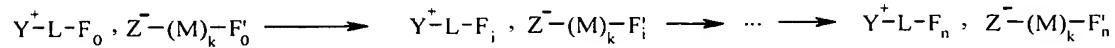
25           **44. (new)** The method according to claim 31, characterized in that  $A_1^+$  is a functional cation and  $X_1^-$  is a functional anion, said functional cation  $A_1^+$  being able to be represented in the form  $Y^+-L-F_i$ , and said functional anion  $X_1^-$  being able to be represented in the form  $Z^--(M)_k-F'_i$ , k being equal to 0 or 1,

30            $Y^+$  representing a cationic entity, optionally bound by means of an arm L, in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms, to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10,

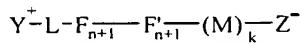
30            $Z^-$  representing an anionic entity, optionally bound by means of an arm M, in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms, to at

least one function  $F'_i$ ,  $F'_i$  varying from  $F'_0$  to  $F'_n$ ,  $n$  being an integer varying from 1 to 10,

and in which the onium salt  $A_1^+$ ,  $X_1^-$  has as its initial form  $Y^+L-F_0$ ,  $Z^-(M)_k-F'_0$ , for obtaining a molecule  $G$ , comprising converting said initial functions  $F_0$  and  $F'_0$  according to the diagram



and by reaction of  $F_n$  on  $F'_n$  in the functionalized onium salt  $Y^+L-F_n, Z^-(M)_k-F'_n$  leading to the formation of an internal salt of formula:

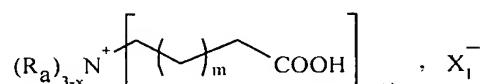
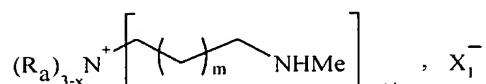
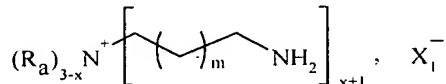
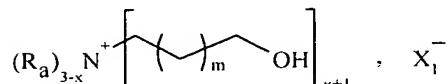


said molecule  $G$  being obtained by cleavage of the abovementioned internal salt and corresponding to the formula  $F_{n+2}-F'_{n+2}$ ,

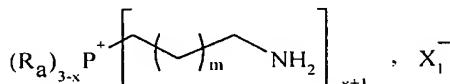
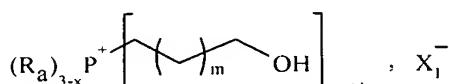
and the functionalized onium salt being able to be recovered or recycled in its initial form  $Y^+L-F_0, Z^-(M)_k-F'_0$ , after the release of  $G$ .

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**45. (new)** The method according to claim 31, characterized in that the onium salt is chosen from the following salts:

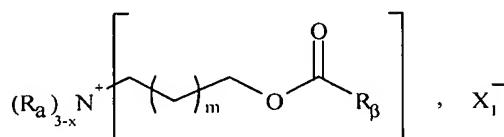
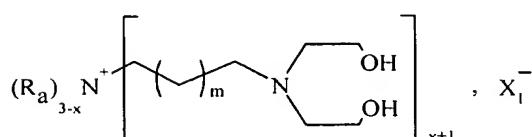
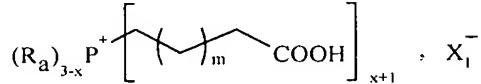
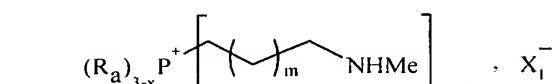


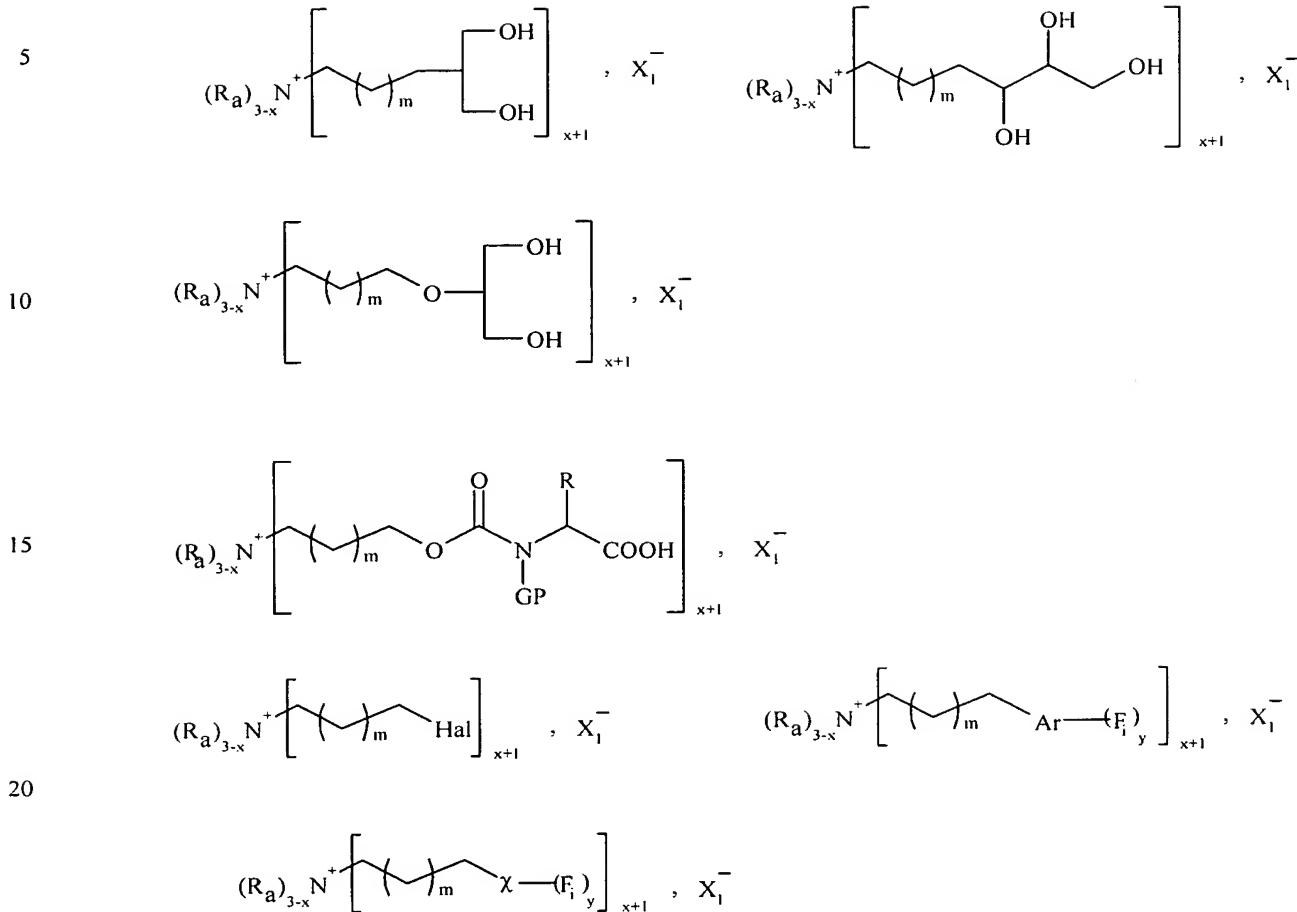
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R representing a hydrogen atom, an alkyl group, functional or non-functional, comprising from 1 to 20 carbon atoms, or an aryl group, functional or non-functional, comprising from 6 to 30 carbon atoms,

$x$  representing an integer comprised from 0 to 3,

y representing an integer comprised from 1 to 5,

Ar representing a functional or polyfunctional aromatic ring,

30  $F_i$  being chosen from the standard functions of organic chemistry, such as the hydroxyl functions, carboxylic acid, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, phosphine (primary, secondary or tertiary), azide, imine, ketene, cumulene, heterocumulene, thiol, thioether,

sulphoxide, phosphorated groups, heterocycles, sulphonic acid, silane, stannane or functional aryl,

Hal representing a halogen atom, in particular chosen from chlorine, bromine and iodine,

5  $\chi$  representing a carbocycle or a functional heterocycle,

$X_1^-$  being chosen from:  $\text{NTf}_2^-$ ,  $\text{PF}_6^-$ ,  $\text{BF}_4^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{MeSO}_4^-$ ,  $\text{EtSO}_4^-$ ,  $\text{MeSO}_3^-$ ,  $\text{C}_6\text{H}_5\text{SO}_3^-$ ,  $\text{pMeC}_6\text{H}_4\text{SO}_3^-$ ,

m being an integer comprised from 0 to 20,

10  $R_\beta$  representing a dienyl, vinyl group, substituted or non-substituted, functional alkyl comprising from 1 to 20 carbon atoms, or functional aryl comprising from 6 to 30 carbon atoms, substituted or non-substituted alkynyl, and being in particular an alkylvinyl, alkylalkynyl, alkylaryl, alkyldienyl, alkylmalonyl, acyl group,

15 and  $R_a$  representing a branched or non-branched alkyl group comprising from 1 to 20 carbon atoms, in particular an ethyl, propyl, butyl, pentyl, hexyl, heptyl or octyl group.

**46. (new)** The method according to claim 31, characterized in that the solvent(s) used is/are an aprotic solvent, chosen from:

20 – solvents the dielectric constant  $\epsilon$  of which is less than or equal to 2, such as the alkanes, the aromatic carbides such as benzene, toluene or xylene,

– solvents the dielectric constant  $\epsilon$  of which is comprised between approximately 2 and 15, such as the ethers, halogenobenzenes or dichloromethane, and

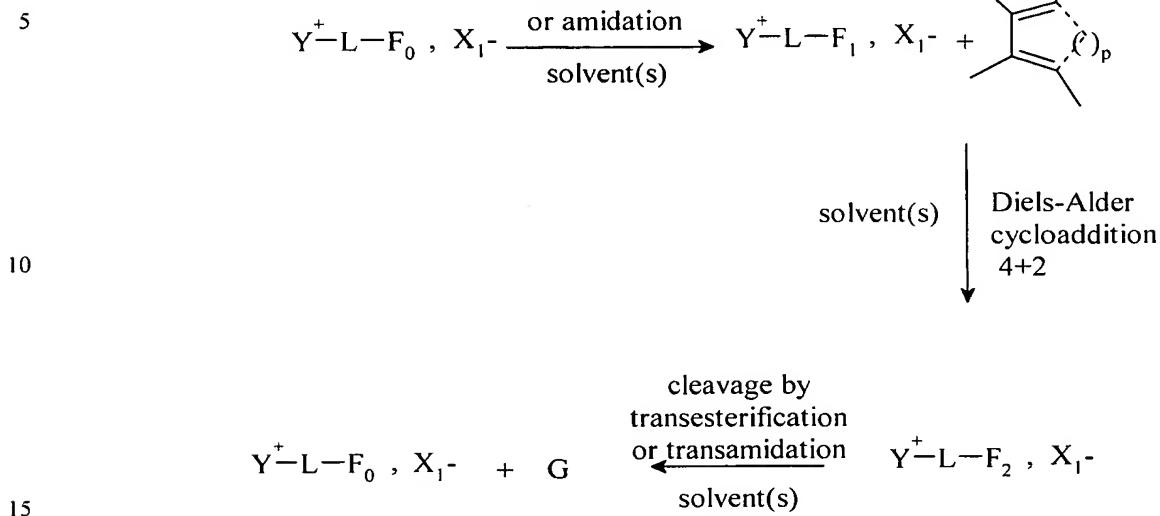
– solvents the dielectric constant  $\epsilon$  of which is greater than 15, such as acetonitrile, nitromethane, DMF or dimethylacetamide.

25 **47. (new)** The method according to claim 31, for continuous, discontinuous, combinatorial or parallel organic synthesis, and/or for the preparation of banks of products.

30 **48. (new)** The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+-L-F_i$ , wherein  $Y^+-$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10,

for the implementation of cycloaddition reactions, preferably for the implementation of the Diels-Alder reaction, according to one of the following reaction diagrams:

a)



p being an integer varying from 0 to 2,

$\text{Y}^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(\text{CH}_2)_r$ , r varying from 1 to 20, and preferably from 2 to 10,

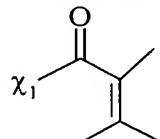
$\text{X}_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions  $\text{F}_0$ ,  $\text{F}_1$  and  $\text{F}_2$  being as defined below:

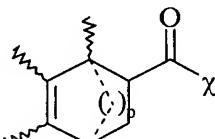
- $F_0$  corresponds to a  $-\chi_1 H$  group, in which  $\chi_1$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

- $F_1$  corresponds to the following formula:



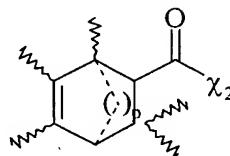
$\chi_1$  being as defined above.

- $F_2$  corresponds to the following formula:



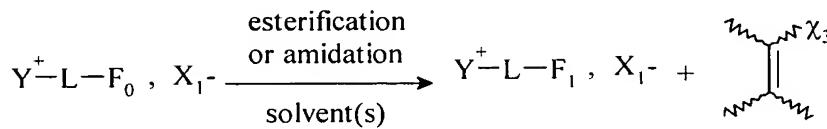
$\chi_1$  being as defined above.

G corresponding to the following formula:



15 in which  $\chi_2$  represents either an  $OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

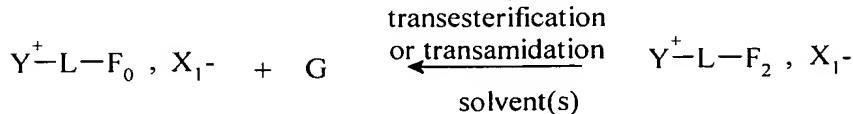
20 b)



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solvent(s) Diels Adler  
cycloaddition 4+2

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$Y^+ -$ , L and  $X_1^-$  being as defined previously,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, or a mixture of these solvents,

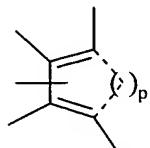
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the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

–  $F_0$  represents any function making it possible to attach a 1,3-diene, and is in particular chosen from the carbonyl, amine, alkoxy, silane, stannane and borane functions, comprising from 1 to 20 carbon atoms,

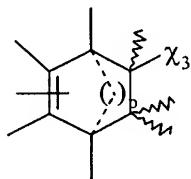
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–  $F_1$  corresponds to the following formula:



$P$  being an integer varying from 0 to 2,

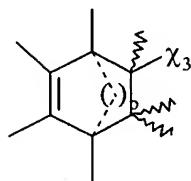
–  $F_2$  corresponds to the following formula:



$\chi_3$  representing an electroattractive group, in particular chosen from the cyano, alkoxy carbonyl groups, comprising from 1 to 20 carbon atoms, acyl comprising from 2 to 20 carbon atoms, benzoyl, sulphonyl, dialkoxyphosphonyl comprising from 1 to 10 carbon atoms,

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G corresponding to the following formula:

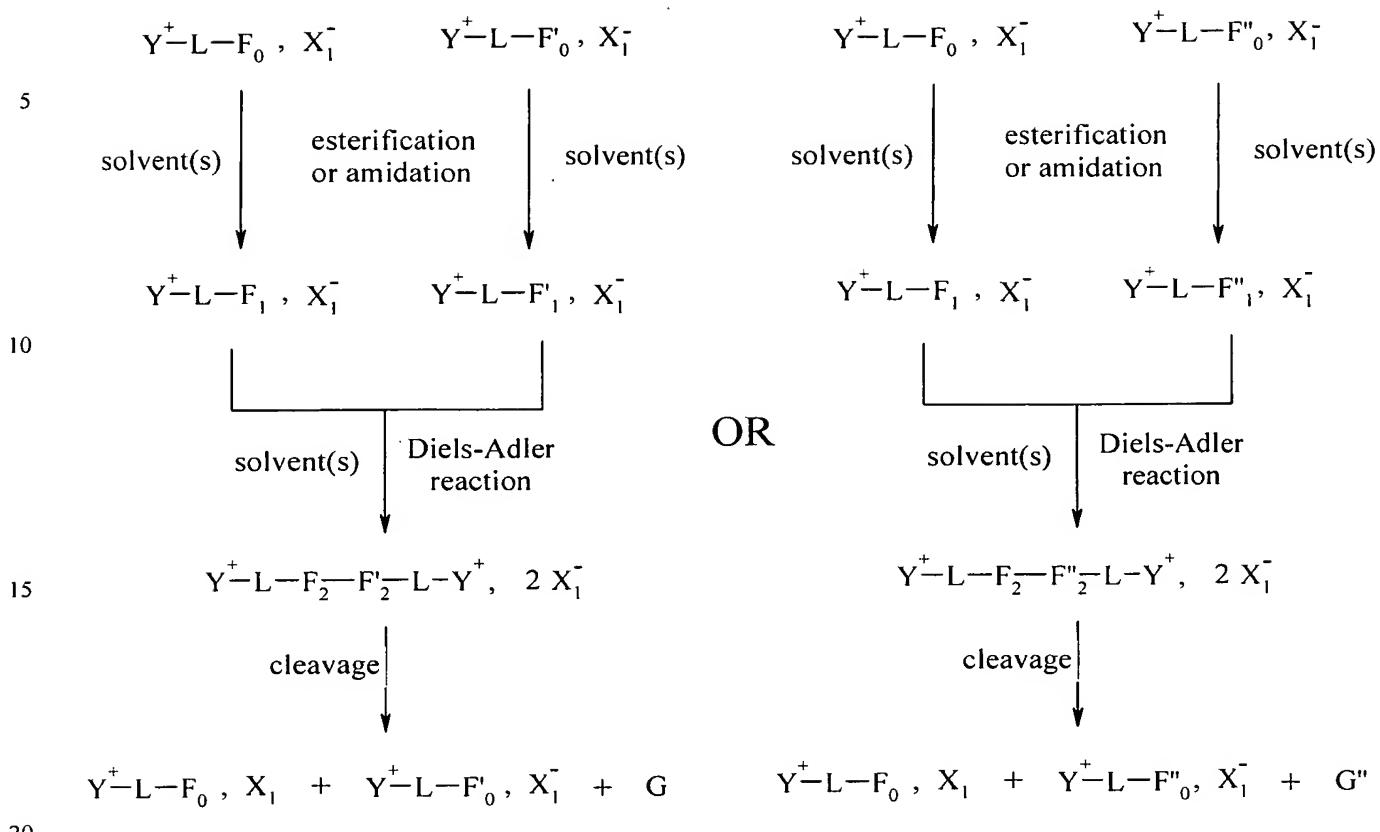


$\chi_3$  being as defined above.

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c)



$Y^+$ , L and  $X_1^-$  being as defined previously,

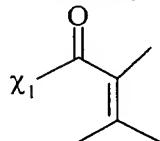
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions  $F_0$ ,  $F'_0$ ,  $F''_0$ ,  $F_1$ ,  $F'_1$ ,  $F''_1$ ,  $F_2$ ,  $F'_2$  and  $F''_2$  being as defined below:

–  $F_0$  and  $F'_0$  correspond respectively to a  $-\chi_1 H$  and  $-\chi'_1 H$  group, in which  $\chi_1$  and  $\chi'_1$ , identical or different, represent an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

–  $F''_0$  corresponds to a  $-COOH$  function;

- $F_1$  corresponds to the following formula:



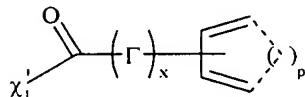
$\chi_1$  being as defined above,

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- $F'_1$  corresponds to the following formula:

$p$  being an integer varying from 0 to 2,

$\chi'_1$  being as defined above,

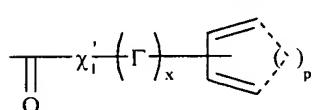


$x$  being equal to 0 or 1,

$\Gamma$  representing an alkyl chain comprising from 1 to 30 carbon atoms, alkaryl, aralkyl, aryl comprising from 6 to 30 carbon atoms,

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- $F''_1$  corresponds to the following formula:

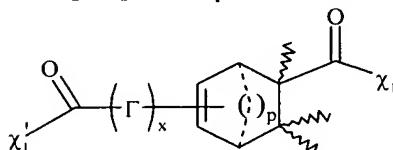


$p, x$  and  $\Gamma$  being as defined above,

$\chi'_1$  being as defined above,

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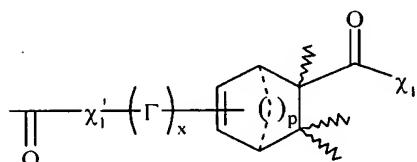
- $F_2-F'_2$  corresponds to the following formula:



$p, \chi_1, \chi'_1, x$  and  $\Gamma$  being as defined above,

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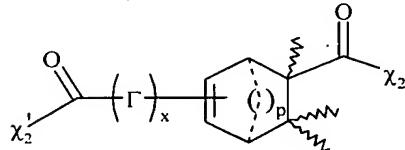
- $F_2-F''_2$  corresponds to the following formula:



$p, \chi_1, \chi'_1, x$  and  $\Gamma$  being as defined above,

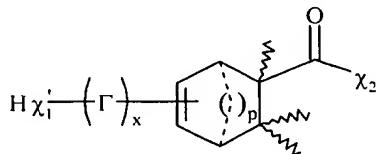
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- $G$  corresponds to the following formula:



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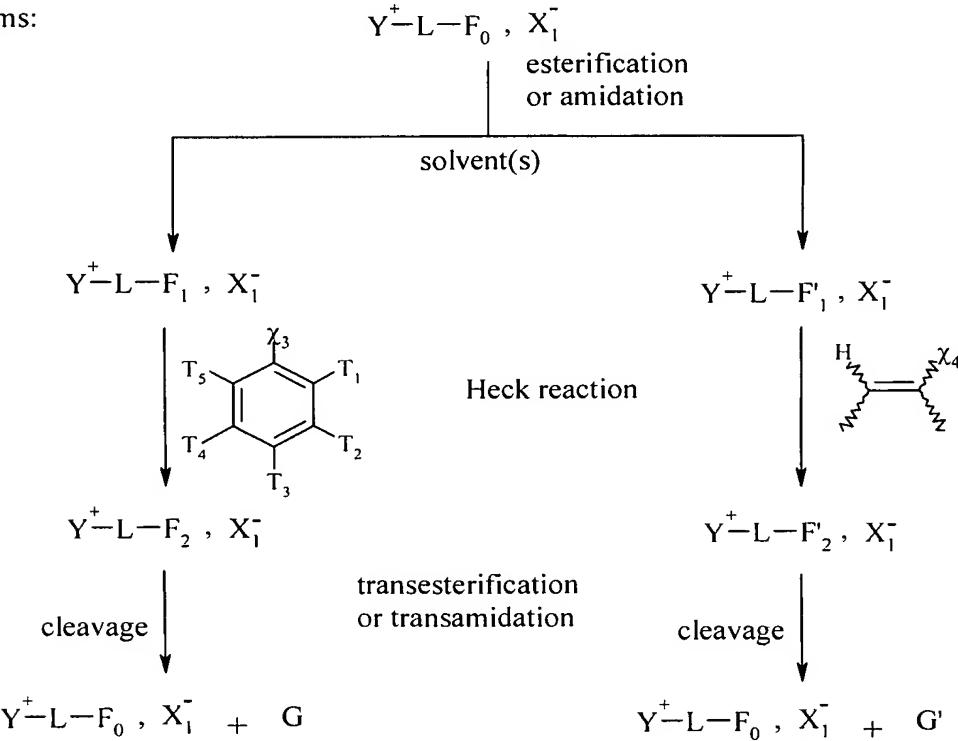
- $G''$  corresponds to the following formula:



$\chi_2$  and  $\chi'_2$ , identical or different, represent either an  $OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

**49. (new)** The method according to claim 31, for the implementation of coupling reactions such as the Heck, Suzuki, Sonogashira or Ullmann reactions.

**50. (new)** The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+-L-F_i$ , wherein  $Y^+-$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10, for the implementation of the Heck reaction, according to one of the following reaction diagrams:



$Y^+-$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 2 to 10,

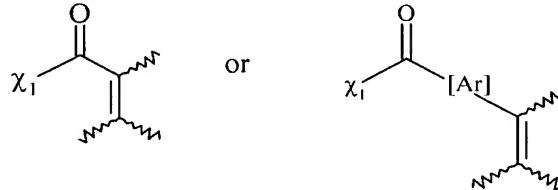
X<sub>1</sub><sup>-</sup> being as defined in claim 31, and being in particular Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, CF<sub>3</sub>CO<sub>2</sub><sup>-</sup>, CH<sub>3</sub>CO<sub>2</sub><sup>-</sup>, BF<sub>4</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, N(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, SO<sub>4</sub><sup>2-</sup>, R<sub>1</sub>SO<sub>4</sub><sup>-</sup>, SbF<sub>6</sub><sup>-</sup>, R<sub>1</sub>SO<sub>3</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>, R<sub>1</sub> representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F<sub>0</sub>, F<sub>1</sub>, F'<sub>1</sub>, F<sub>2</sub> and F'<sub>2</sub> being as defined below:

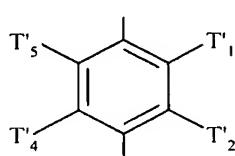
– F<sub>0</sub> corresponds to a -χ<sub>1</sub>H group, in which χ<sub>1</sub> represents an oxygen atom or an -NR<sub>f</sub> group, R<sub>f</sub> corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F<sub>1</sub> corresponds to one of the following formulae:



χ<sub>1</sub> being as defined above,

[Ar] representing an aromatic ring, optionally substituted by a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a functional group in particular chosen from NO<sub>2</sub>, CN, COOR, OR, COR, NHCOR, NRR', SO<sub>2</sub>R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, [Ar] preferably corresponding to the following formula:

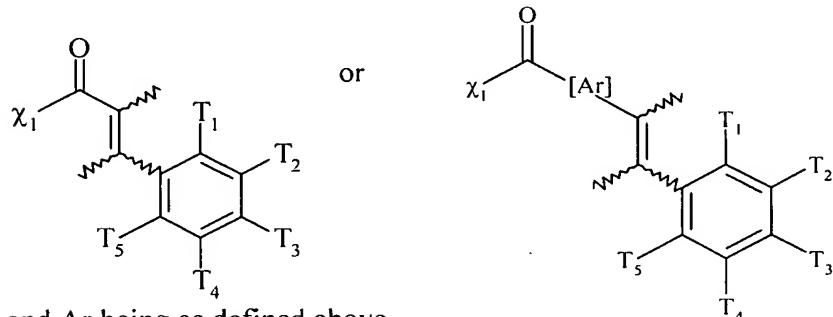


in which T'<sub>1</sub>, T'<sub>2</sub>, T'<sub>4</sub> and T'<sub>5</sub> represent independently of one another a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a

functional group in particular chosen from  $\text{NO}_2$ ,  $\text{CN}$ ,  $\text{COOR}$ ,  $\text{OR}$ ,  $\text{COR}$ ,  $\text{NHCOR}$ ,  $\text{NRR}'$ ,  $\text{SO}_2\text{R}$ ,  $\text{I}$ ,  $\text{Br}$ ,  $\text{R}$  and  $\text{R}'$  representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

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–  $F_2$  corresponds to one of the following formulae:



$\chi_1$  and  $\text{Ar}$  being as defined above,

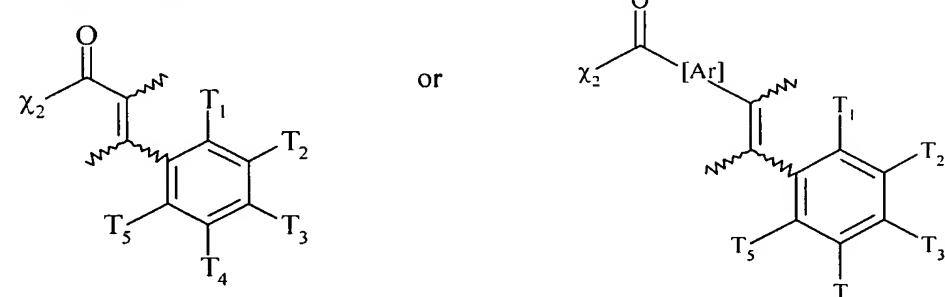
10

or

15

$T_1$ ,  $T_2$ ,  $T_3$ ,  $T_4$  and  $T_5$  corresponding to the definition given above for  $T'_1$ ,  $T'_2$ ,  $T'_4$ , and  $T'_5$

$G$  corresponding to one of the following formulae:



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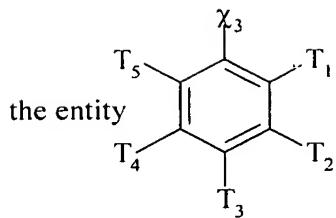
or

25

in which  $\chi_2$  represents either an  $-\text{OR}_g$  group,  $\text{R}_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-\text{NR}_h\text{R}_u$  group,  $\text{R}_h$  and  $\text{R}_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

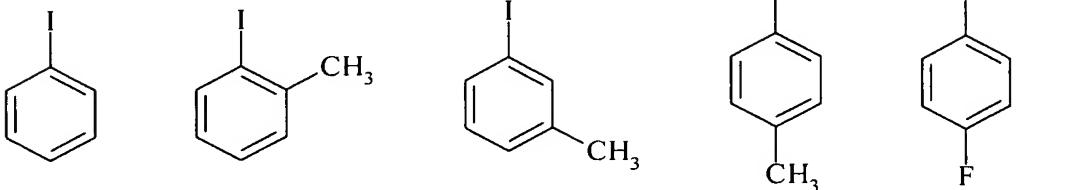
$\chi_3$  representing a leaving group, in particular chosen from the  $\text{I}$ ,  $\text{Cl}$  and  $\text{Br}$  halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

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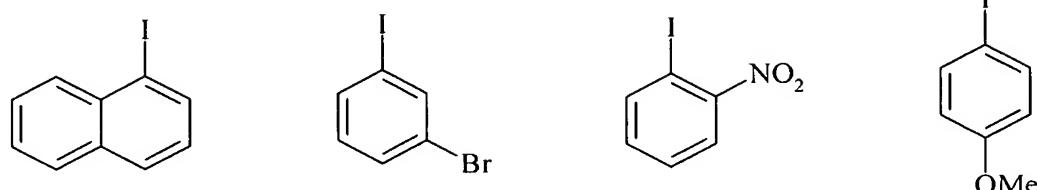


representing in particular the following groups:

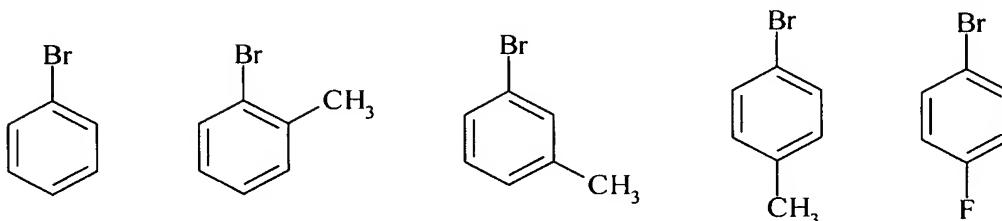
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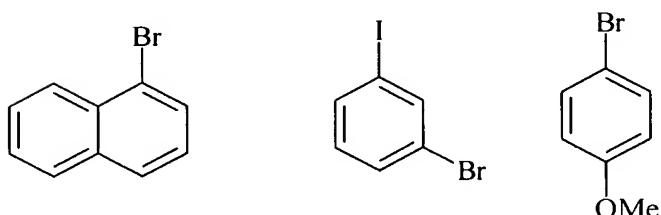
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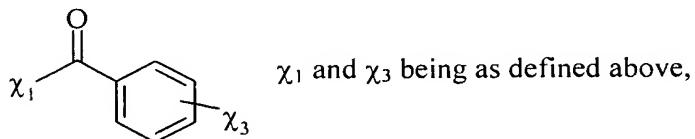


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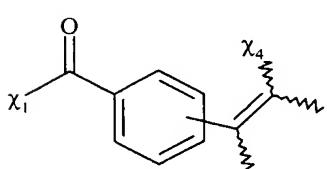
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–  $F'_1$  corresponds to the following formula:



30

–  $F'_2$  corresponds to the following formula:

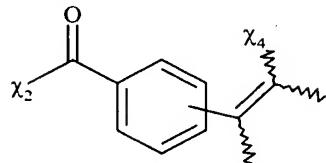


$\chi_1$  being as defined above,

$\chi_4$  representing a functional group of ester, amide, sulphone, phosphonate, silane, borane type, or a

functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a functional or non-functional aryl group, comprising from 6 to 30 carbon atoms,

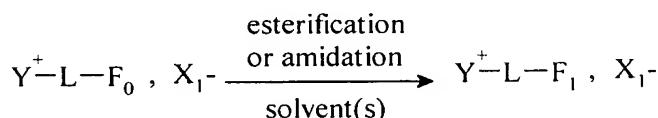
5 G' corresponding to the following formula:



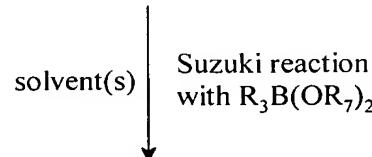
$\chi_2$  and  $\chi_4$  being as defined above.

10 51. (new) The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+-L-F_i$ , wherein  $Y^+-$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10,  
for the implementation of Suzuki coupling, according to one of the following reaction  
15 diagrams:

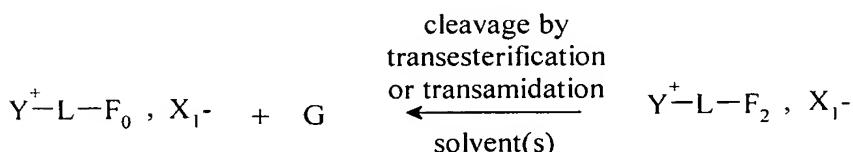
a)



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$R_3$  being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms,

35  $R_7$  representing a hydrogen atom or a branched or linear alkyl group, or a cycloalkyl group comprising from 1 to 12 carbon atoms,

$Y^+-$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

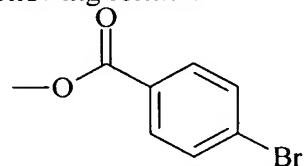
5  $X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

10 the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

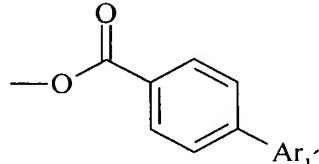
the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

15 –  $F_0$  is in the form  $-\chi_1H$ ,  $\chi_1$  representing an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

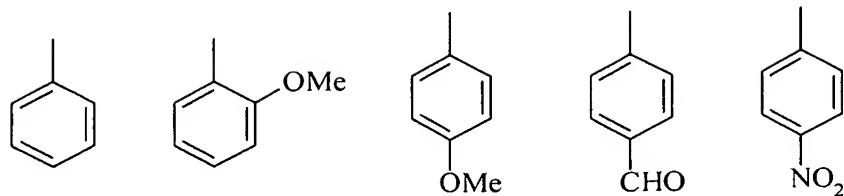
20 –  $F_1$  is in the form  $-R_e-\chi$ ,  $R_e$  representing an aromatic or heteroaromatic group comprising from 6 to 30 carbon atoms,  $\chi$  representing a leaving group preferably chosen from  $Cl$ ,  $Br$ ,  $I$ ,  $OTf$ ,  $O-CO_2R^5$  or  $OSO_3-R^5$ ,  $R^5$  representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms,  $F_1$  preferably corresponding to the following formula:



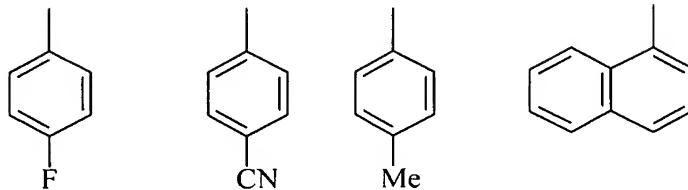
25 –  $F_2$  is in the form  $-R_e-R_2$ ,  $R_e$  being as defined above and  $R_2$  being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms,  $F_2$  preferably corresponding to the following formula:



30  $Ar_1$  representing an aromatic group preferably chosen from:



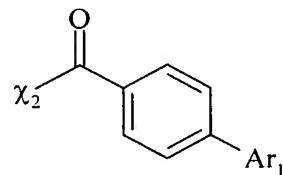
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the molecule G being in the form  $R_2-R_3$ ,  $R_2$  and  $R_3$  being as defined above, and corresponding in particular to the following formula:

15



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in which  $\chi_2$  represents either an  $-OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

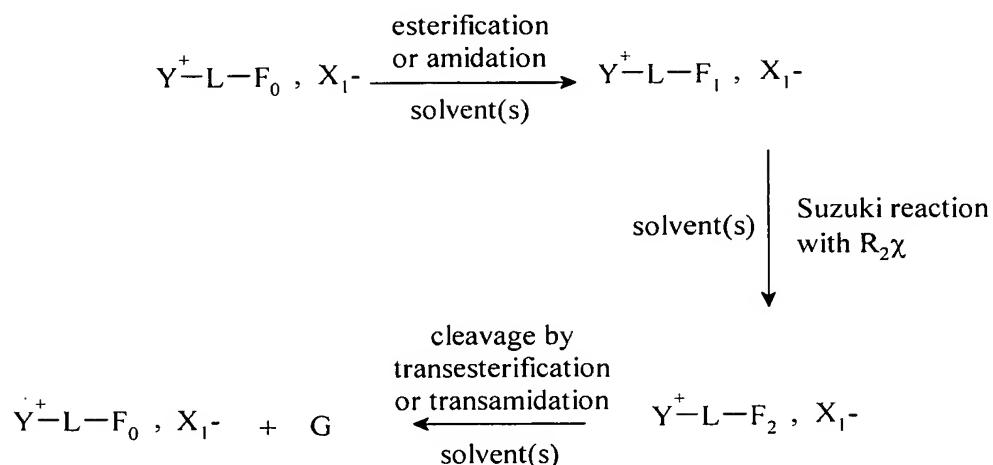
$Ar_1$  is as defined above,

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b)



$Y^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

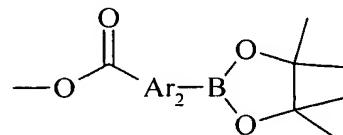
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

$R_2$  being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms,

the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

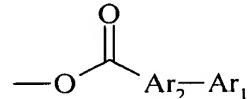
–  $F_0$  is in the form  $-\chi_1 H$ ,  $\chi_1$  being as defined above,

–  $F_1$  is in the form  $-R_q-B(OR_7)_2$ ,  $R_7$  being as defined above, and  $R_q$  corresponding to an aryl group comprising from 6 to 30 carbon atoms, heteroaryl comprising from 4 to 20 carbon atoms, ethenyl comprising from 2 to 20 carbon atoms, dienyl comprising from 3 to 20 carbon atoms, allyl comprising from 3 to 20 carbon atoms, ethynyl comprising from 2 to 20 carbon atoms, substituted or non-substituted,  $F_1$  preferably corresponding to the following formula:



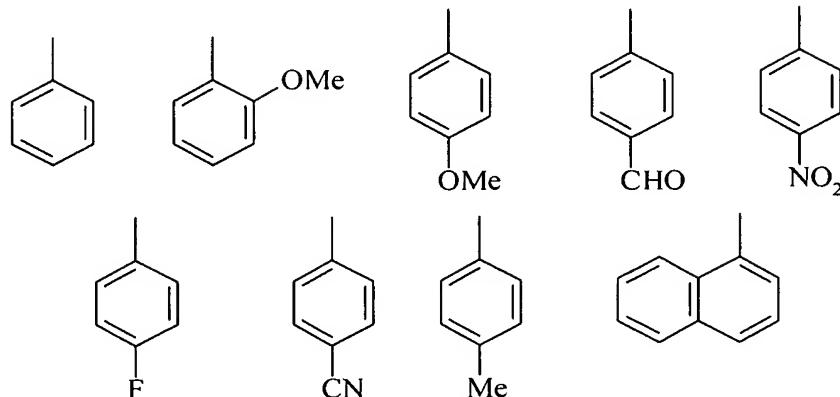
$Ar_2$  corresponding to an aryl group, substituted or non-substituted, comprising from 6 to 30 carbon atoms,

–  $F_2$  is in the form  $-R_q-R_e$ ,  $R_q$  and  $R_e$  being as defined above,  $F_2$  preferably corresponding to the following formula:

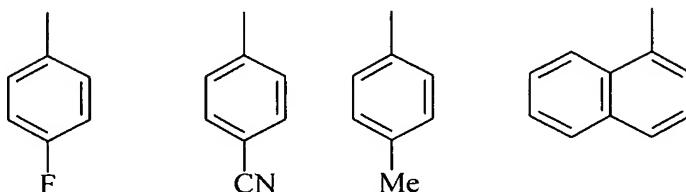


$\text{Ar}_1$  representing an aromatic group preferably chosen from:

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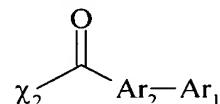


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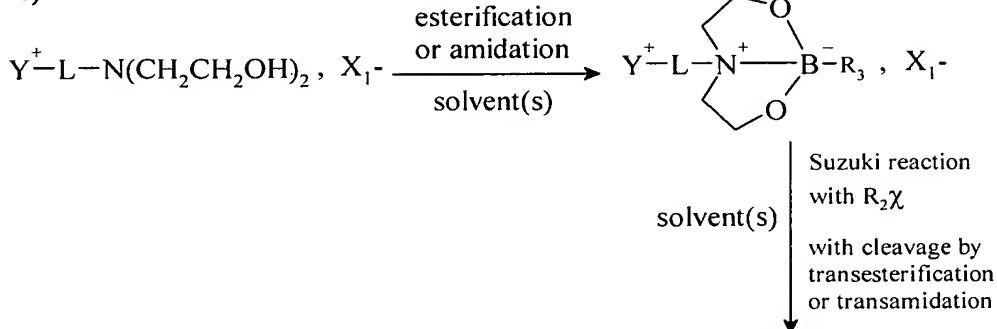
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the molecule G being in the form  $\text{R}_2-\text{R}_3$ ,  $\text{R}_2$  and  $\text{R}_3$  being as defined above, and corresponding in particular to the following formula:

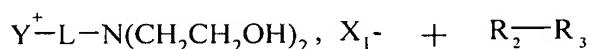


in which  $\chi_2$ ,  $\text{Ar}_1$  and  $\text{Ar}_2$  are as defined above,

c)



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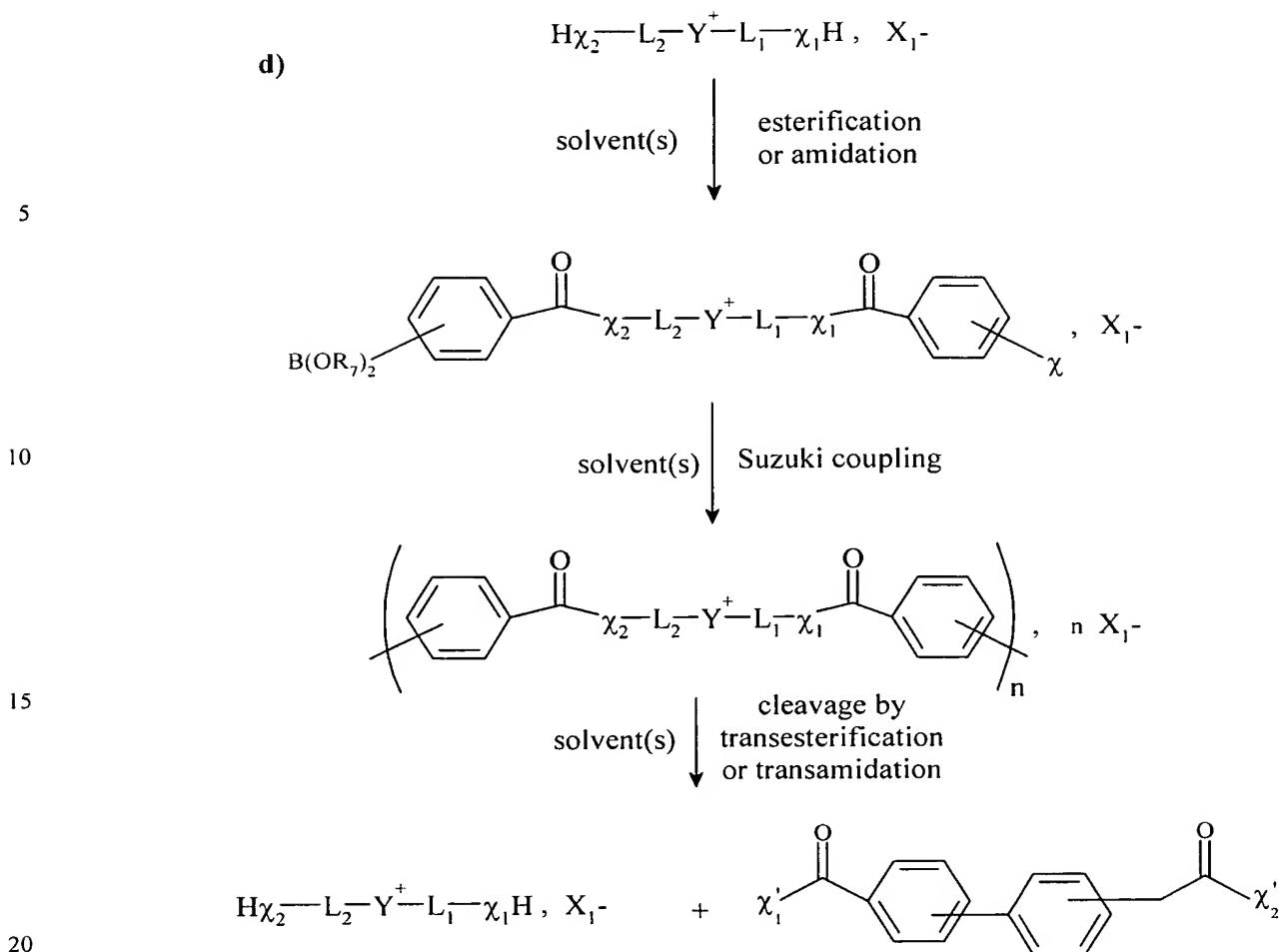


$\text{Y}^+$ ,  $\text{L}$ ,  $\text{X}_1^-$ ,  $\text{R}_2$  and  $\text{R}_3$  being as defined above,

$\text{R}_3$  preferably being a phenyl group,

30

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,



n representing an integer comprised between 1 and 50,

$\text{Y}^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

25 L<sub>1</sub> and L<sub>2</sub> representing an arm, identical or different, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group preferably a linear alkyl group of type (CH<sub>2</sub>)<sub>r</sub>, r varying from 1 to 20, and preferably from 1 to 10,

30             $X_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  
 $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  
 $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

5  $\chi_1$  and  $\chi_2$ , identical or different, representing an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

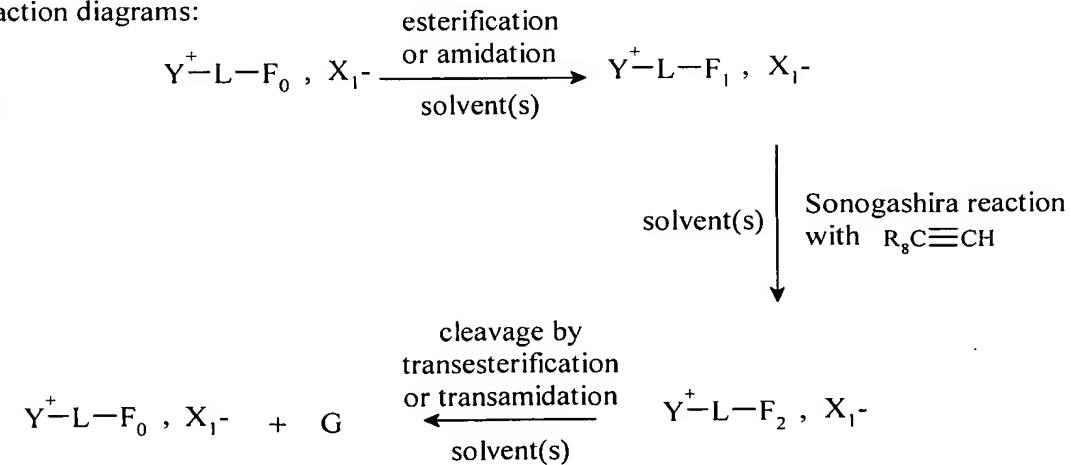
10  $\chi$  representing a leaving group preferably chosen from Cl, Br, I, OTf, O-CO<sub>2</sub>R<sup>5</sup> or OSO<sub>3</sub>-R<sup>5</sup>, R<sup>5</sup> representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms,

$R_7$  representing a hydrogen atom, a branched or non-branched alkyl group, or cycloalkyl, comprising from 1 to 12 carbon atoms, or an aryl group, comprising from 6 to 30 carbon atoms,

15  $\chi'_1$  and  $\chi'_2$ , identical or different, representing either an  $-OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

20 52. (new) The method according to claim 31, wherein A<sub>1</sub><sup>+</sup> is a functional cation being able to be represented in the form Y<sup>+-</sup>-L-F<sub>i</sub>, wherein Y<sup>+-</sup> corresponds to a cationic entity, optionally bound by means of an arm L to at least one function F<sub>i</sub>, F<sub>i</sub> varying from F<sub>0</sub> to F<sub>n</sub>, n being an integer varying from 1 to 10,

25 for the implementation of Sonogashira coupling, according to one of the following reaction diagrams:



$Y^+$ — representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

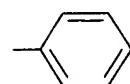
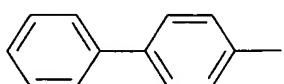
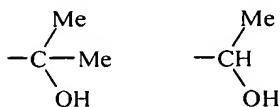
$R_8$  representing an  $OR_h$ ,  $NR_hR_u$ ,  $COR_h$ ,  $CN$ ,  $SO_2R_h$ ,  $SR_h$  group, an alkenyl, ethynyl, dienyl group,  $R_h$  and  $R_u$  representing, independently of one another, a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

or  $R_8$  representing an alkyl group, branched or linear, optionally functional, comprising from 1 to 20 carbon atoms, or an aryl group, or an alkaryl or aralkyl group, comprising from 6 to 30 carbon atoms, substituted or non-substituted, said alkyl or aryl groups being able to be substituted by one of the following functional groups: a halogen atom, in particular  $Cl$ , an  $OR_h$ ,  $NR_hR_u$ ,  $COR_h$ ,  $CN$ ,  $SO_2R_h$ ,  $SR_h$  group, an alkenyl, ethynyl, dienyl, vinyl, alkynyl group,  $R_h$  and  $R_u$  being as defined previously,

$R_8$  being in particular one of the following groups:

$-(CH_2)_s-CH_3$ ,  $-(CH_2)_s-CH_2OH$ ,  $-(CH_2)_s-CH_2OMe$ ,

s representing an integer comprised between 0 and 10,

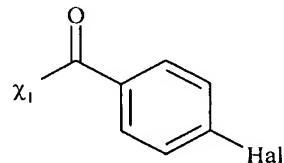


$Me_3Si-$

the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

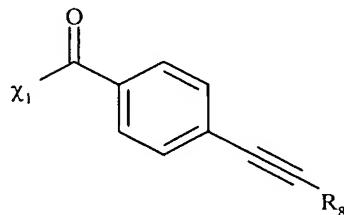
–  $F_0$  corresponds to a  $-\chi_1 H$  group, in which  $\chi_1$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

5 –  $F_1$  corresponds to the following formula:



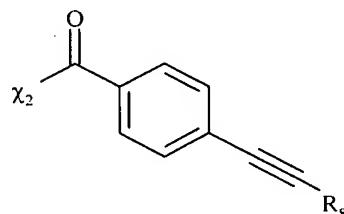
$\chi_1$  being as defined above, and Hal representing a halogen, and preferably being iodine,

10 –  $F_2$  corresponds to the following formula:



$\chi_1$  and  $R_8$  being as defined above,

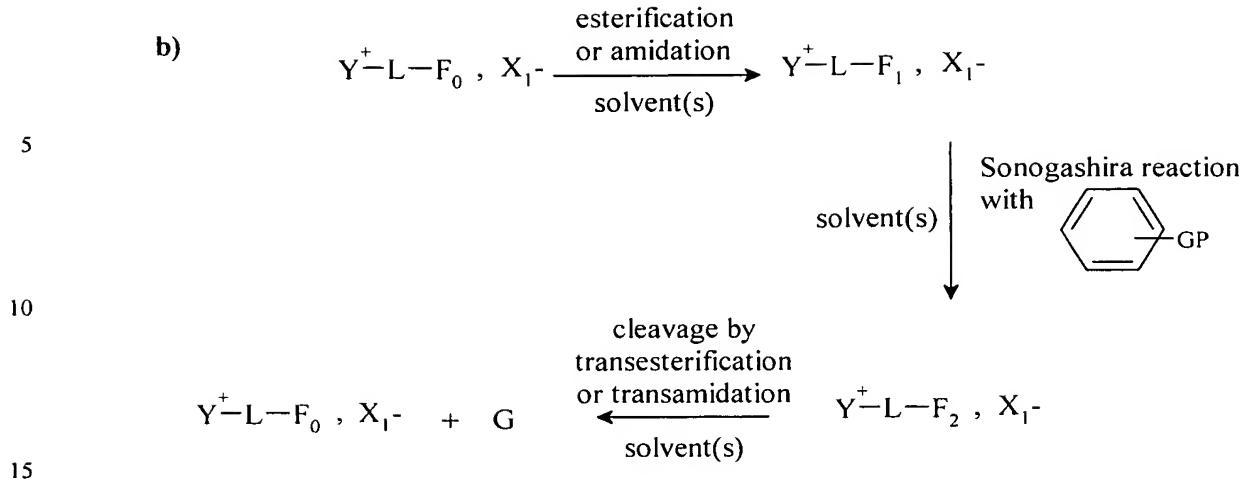
15 G corresponding to the following formula:



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in which  $\chi_2$  represents either an  $-OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,  $\chi_2$  representing in particular an OMe, OEt, OPr or OBu group.

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$Y^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium, alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

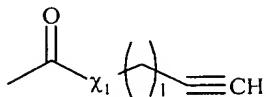
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

GP representing a leaving group, and being in particular Cl, Br, I or OTf,

the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

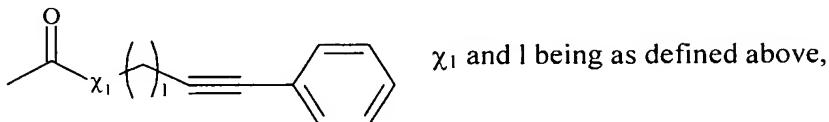
–  $F_0$  corresponds to a -COOH group,

–  $F_1$  corresponds to the following formula:

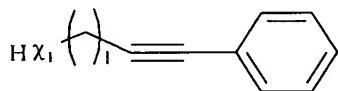


in which  $l$  represents an integer varying from 1 to 20, and  $\chi_1$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

–  $F_2$  corresponds to the following formula:



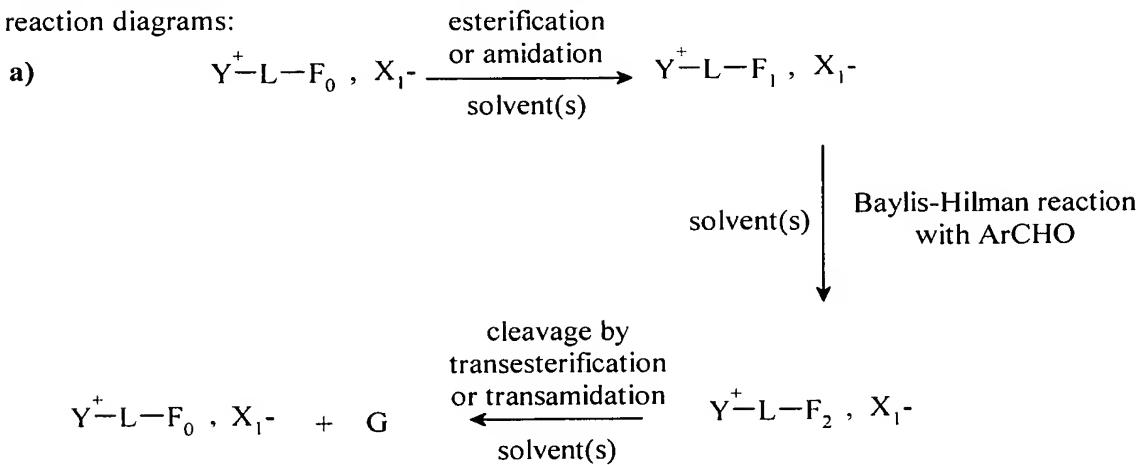
G corresponding to the following formula:



in which  $\chi_1$  and  $l$  are as defined above.

53. (new) The method according to claim 31, wherein  $A_1^+$  is a functional cation

being able to be represented in the form  $Y^+-L-F_i$ , wherein  $Y^+-$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ ,  $n$  being an integer varying from 1 to 10, for the implementation of the Baylis-Hilman reaction, according to one of the following reaction diagrams:



$Y^{+-}$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

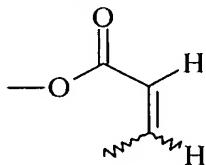
L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

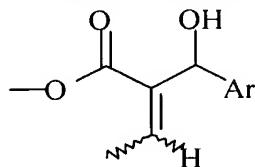
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

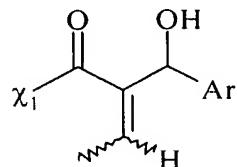
- $F_0$  represents an -OH group,
- $F_1$  corresponds to the following formula:



- $F_2$  corresponds to the following formula:



G corresponding to the following formula:

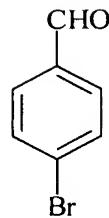
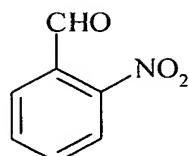
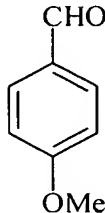
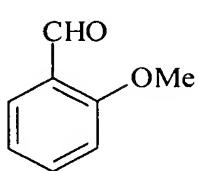


$\chi_1$  representing an -OH group, or an  $-OR_g$  group,  $R_g$  representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms,

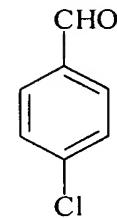
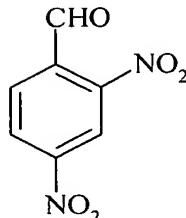
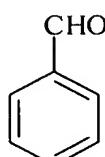
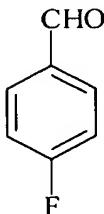
$Ar$  representing an aromatic or heteroaromatic group, substituted or non-substituted,

ArCHO being in particular chosen from:

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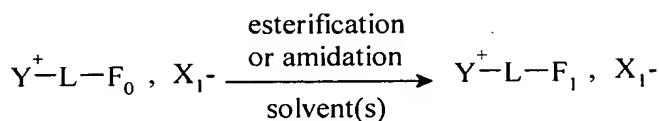


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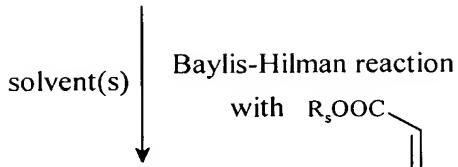
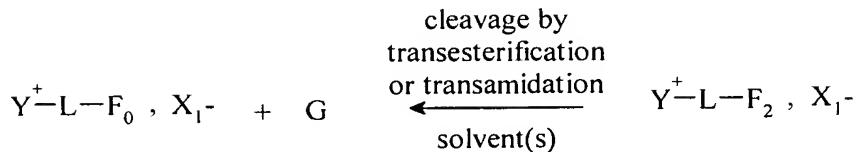


b)

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$Y^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium, alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

30

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

$R_s$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms or aralkyl or alkaryl comprising from 7 to 30 carbon atoms,

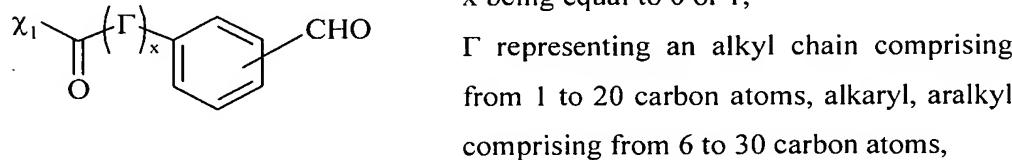
the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

–  $F_0$  corresponds to a  $-\chi_1\text{H}$  group, in which  $\chi_1$  represents an oxygen atom or an  $-\text{NR}_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

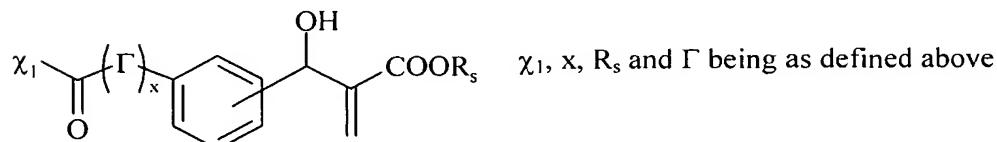
–  $F_1$  corresponds to the following formula:

$\chi_1$  being as defined above,

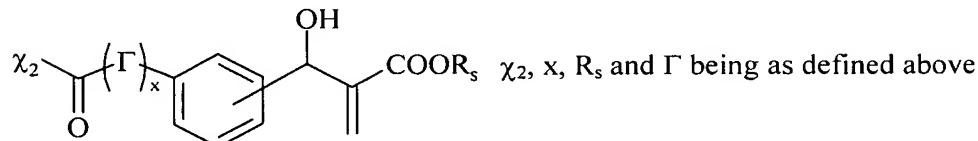
$x$  being equal to 0 or 1,



–  $F_2$  corresponds to the following formula:

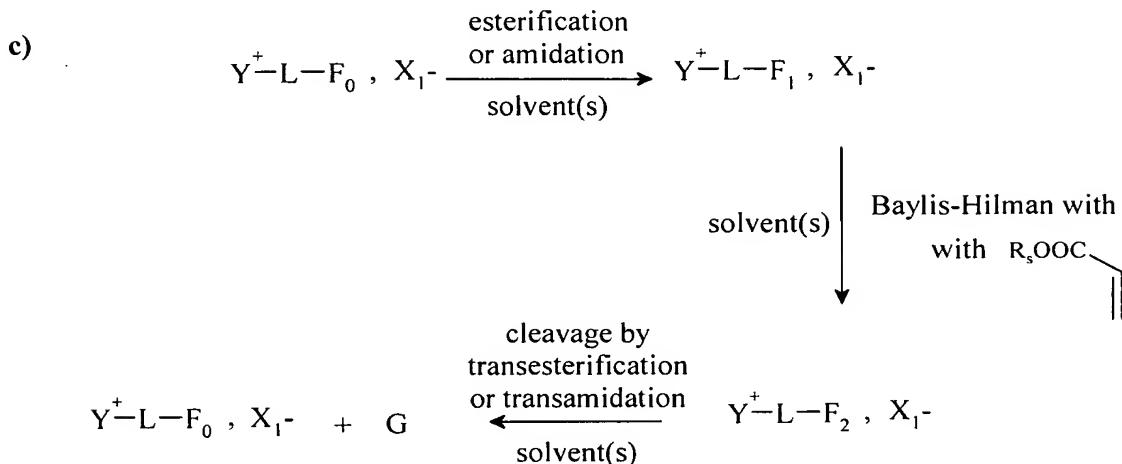


–  $G$  corresponding to the following formula:



in which  $\chi_2$  represents either an  $-\text{OR}_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-\text{NR}_h\text{R}_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising

from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,  $\chi_2$  representing in particular an OMe, OEt, OPr or OBu group.



$\text{Y}^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(\text{CH}_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

$\text{X}_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

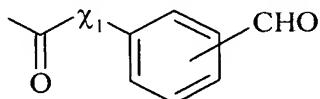
$\text{R}_s$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms or aralkyl or alkaryl comprising from 7 to 30 carbon atoms,

the functions  $\text{F}_0$ ,  $\text{F}_1$  and  $\text{F}_2$  being as defined below:

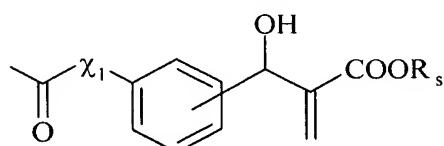
–  $F_0$  corresponds to a  $-CO\chi_1H$  group, in which  $\chi_1$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

–  $F_1$  corresponds to the following formula:

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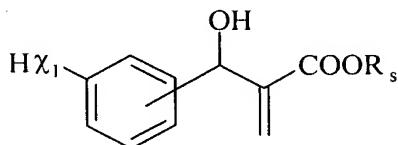


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–  $G$  corresponding to the following formula:

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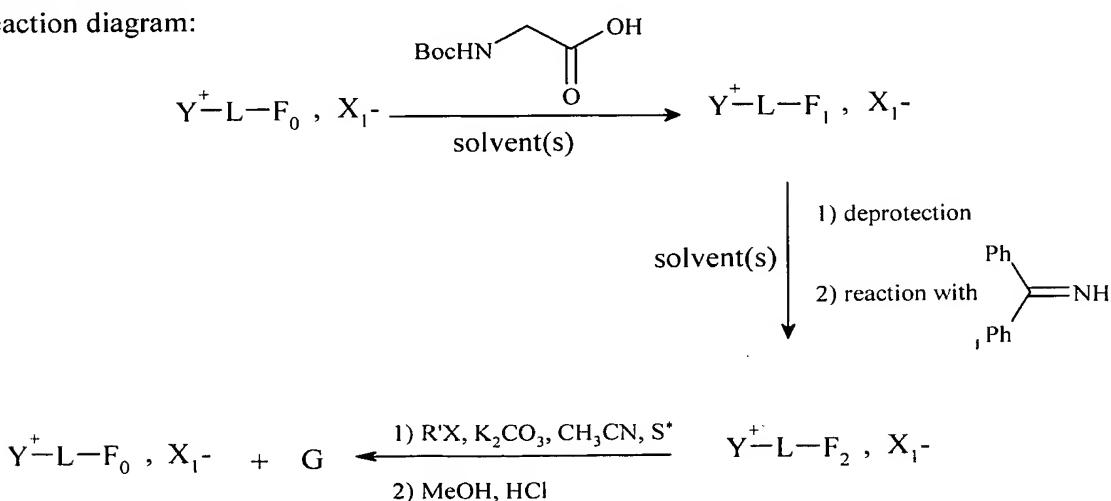


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**54. (new)** The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+-L-F_i$ , wherein  $Y^+-$  corresponds to a cationic entity, optionally bound by means of an arm  $L$  to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ ,  $n$  being an integer varying from 1 to 10, for the synthesis, optionally asymmetrical, of  $\alpha$ -amino acids, according to the following reaction diagram:

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$Y^{+-}$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium or tributylalkylphosphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 3 to 6,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $N(SO_2CF_3)_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,

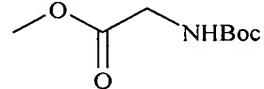
the solvent or solvents being chosen from: acetonitrile, dichloromethane, tetrahydrofuran, dioxane, toluene, chlorobenzene or a mixture of these solvents,

R' representing a linear or branched alkyl group, comprising from 1 to 30 carbon atoms, optionally functional,

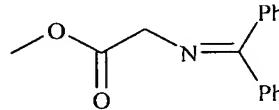
S\* representing a chiral phase transfer agent such as O(9)-allyl-N-9-anthracyl-methylcinchonidinium bromide,

the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

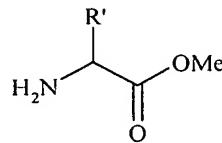
- $F_0$  corresponds to -OH,
- $F_1$  corresponds to the following formula:



- $F_2$  corresponds to the following formula:



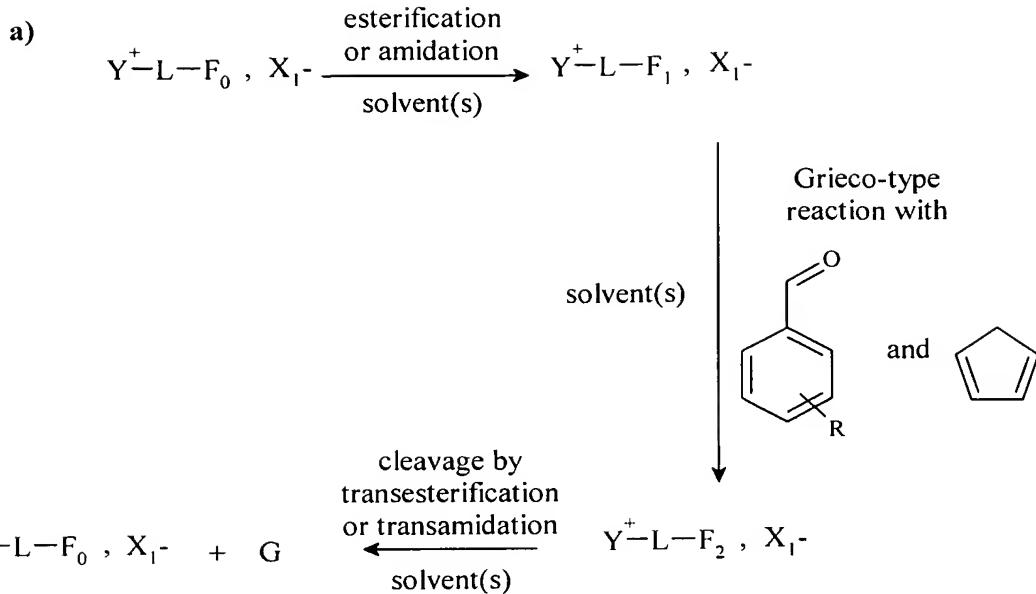
G corresponding to the following formula:



**55. (new)** The method according to claim 31, wherein  $A_1^+$  is a functional cation

being able to be represented in the form  $Y^{+-}L-F_i$ , wherein  $Y^{+-}$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10,

for the implementation of multi-component reactions, in particular for the Grieco-type reaction according to one of the following reaction diagrams:



15         $\text{Y}^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

20        L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(\text{CH}_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

25         $\text{X}_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

30        the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

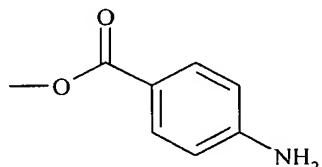
R representing a hydrogen atom, a nitro group in para position, a chlorine atom in para position or a methoxy group in ortho position,

the functions F<sub>0</sub>, F<sub>1</sub> and F<sub>2</sub> being as defined below:

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- F<sub>0</sub> represents an -OH group,

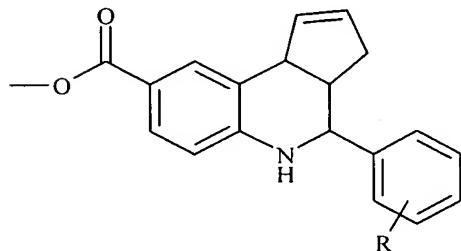
- F<sub>1</sub> corresponds to the following formula:



10

- F<sub>2</sub> corresponds to the following formula:

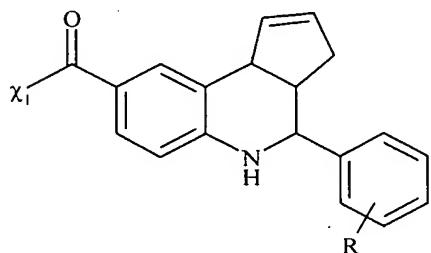
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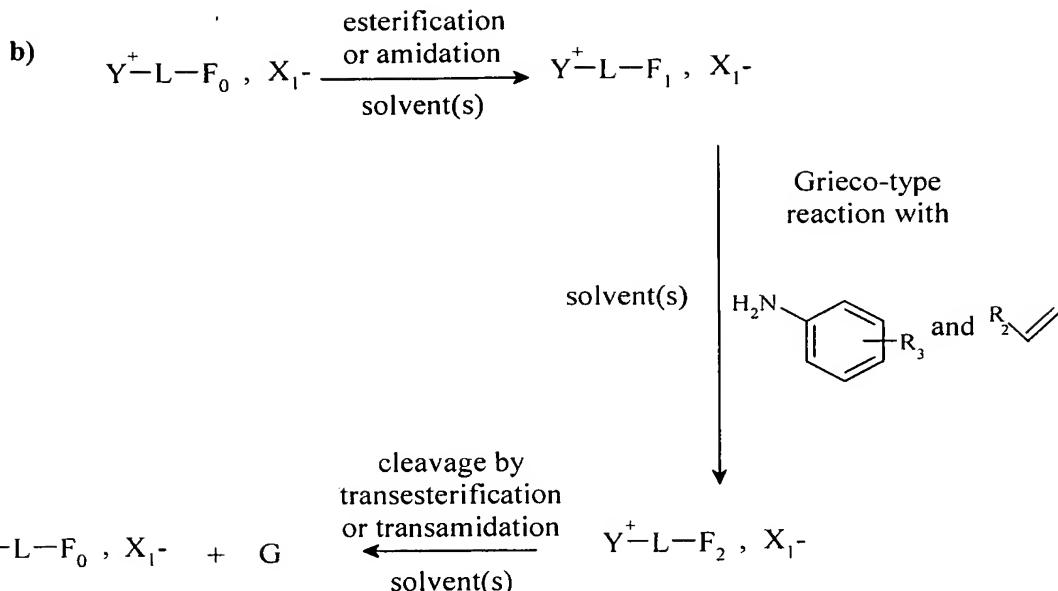
G corresponding to the following formula:

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X<sub>1</sub> representing an -OH group, or an -OR<sub>g</sub> group, R<sub>g</sub> representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms,



15         $\text{Y}^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

20        L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(\text{CH}_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

25         $\text{X}_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

30        the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

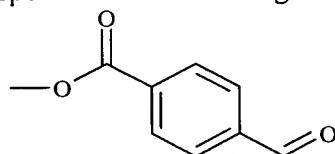
          R<sub>2</sub> representing a functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a functional or non-functional aryl group, comprising from 6 to 30

carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms,

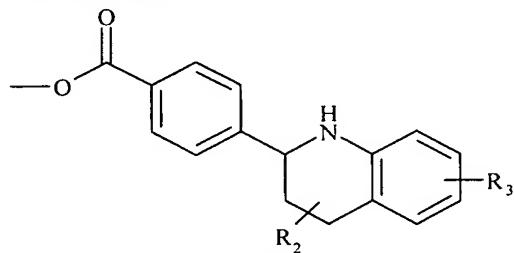
R<sub>3</sub> representing a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms, or a functional group in particular chosen from NO<sub>2</sub>, CN, COOR, OR, COR, NHCOR, NRR', SO<sub>2</sub>R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

the functions F<sub>0</sub>, F<sub>1</sub> and F<sub>2</sub> being as defined below:

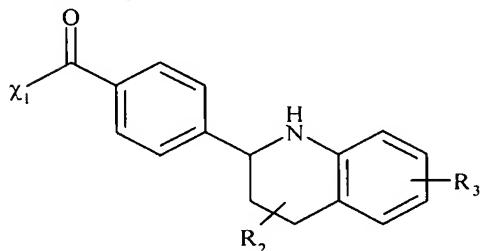
- F<sub>0</sub> represents an -OH group,
- F<sub>1</sub> corresponds to the following formula:



- F<sub>2</sub> corresponds to the following formula:

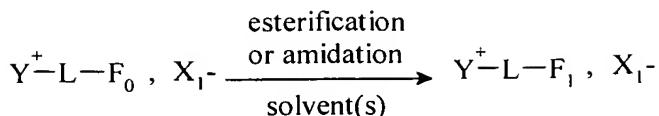


G corresponding to the following formula:



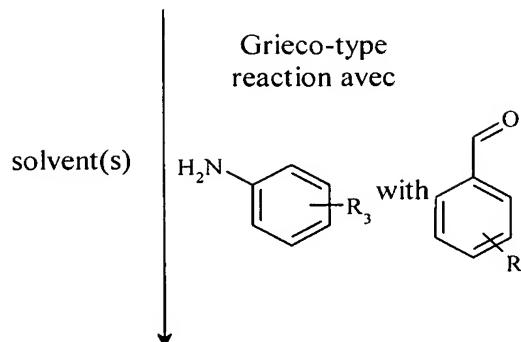
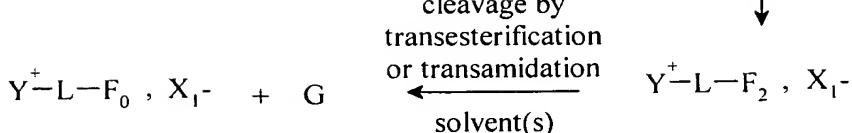
X<sub>1</sub> representing an -OH group, or an -OR<sub>g</sub> group, R<sub>g</sub> representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

c)



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15  $Y^+$  representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

20 L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ , r varying from 1 to 20, and preferably from 1 to 10,

25  $X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

30 the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R representing a hydrogen atom or a functional group such as a nitro group in para position, a chlorine atom in para position or a methoxy group in ortho position, or a functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a

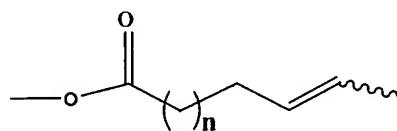
functional or non-functional aryl group, comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms,

R<sub>3</sub> representing a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms, or a functional group in particular chosen from NO<sub>2</sub>, CN, COOR, OR, COR, NHCOR, NRR', SO<sub>2</sub>R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

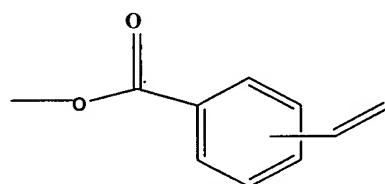
the functions F<sub>0</sub>, F<sub>1</sub> and F<sub>2</sub> being as defined below:

– F<sub>0</sub> represents any function making it possible to attach and release a radical carrying an olefin, preferably an ester, or an amide.

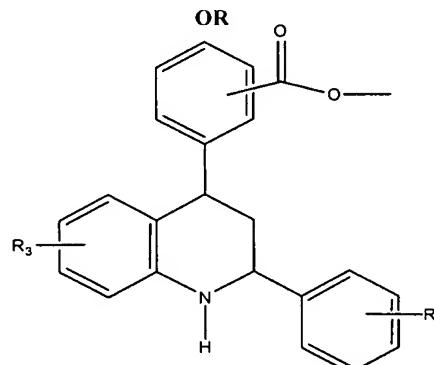
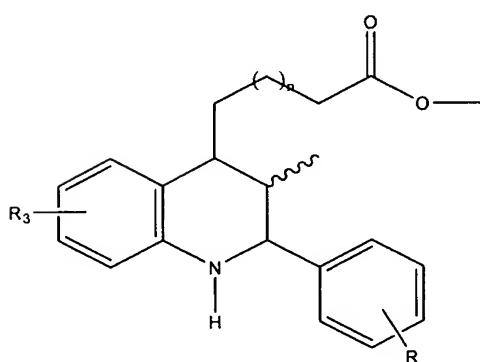
– F<sub>1</sub> corresponds to one of the following general formulae:



n representing an integer varying from 1 to 10

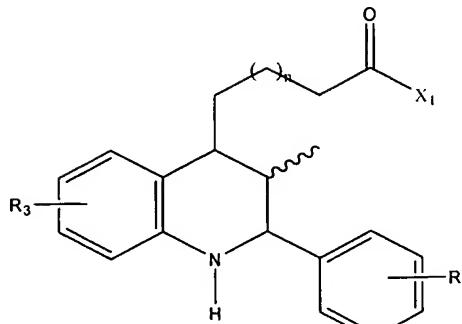


– F<sub>2</sub> corresponds to one of the following general formulae:



G corresponding to one of the following general formulae:

5

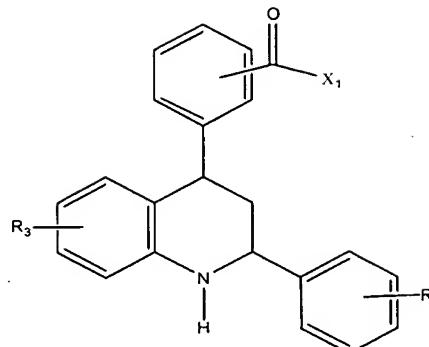


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n, R and R<sub>3</sub> being as defined above, and

X<sub>1</sub> representing an -OH group, or an -OR<sub>g</sub> group, R<sub>g</sub> representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

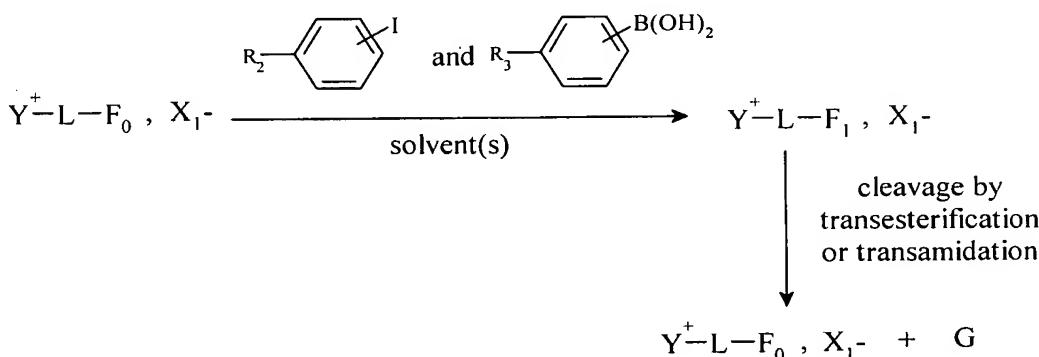
OR



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**56. (new)** The method according to claim 31, wherein A<sub>1</sub><sup>+</sup> is a functional cation being able to be represented in the form Y<sup>+</sup>-L-F<sub>i</sub>, wherein Y<sup>+-</sup> corresponds to a cationic entity, optionally bound by means of an arm L to at least one function F<sub>i</sub>, F<sub>i</sub> varying from F<sub>0</sub> to F<sub>n</sub>, n being an integer varying from 1 to 10, for the implementation of multi-component reactions, in particular for the synthesis of tetrasubstituted olefins, according to the following reaction diagram:

25



30

Y<sup>+-</sup> representing an onium cation, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group,

comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(\text{CH}_2)_r$ ,  $r$  varying from 1 to 20, and preferably from 1 to 10,

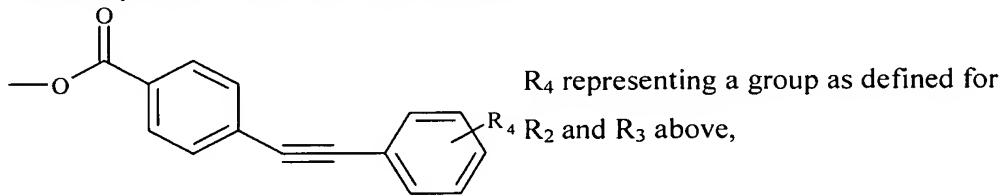
$X_1^-$  being as defined in claim 31, and being in particular  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  
5  $\text{CH}_3\text{CO}_2^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{R}_1\text{SO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{R}_1\text{SO}_3^-$ ,  $\text{FSO}_3^-$ ,  
 $\text{PO}_4^{3-}$ ,  $\text{R}_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, 10 nitromethane, nitroethane, or a mixture of these solvents,

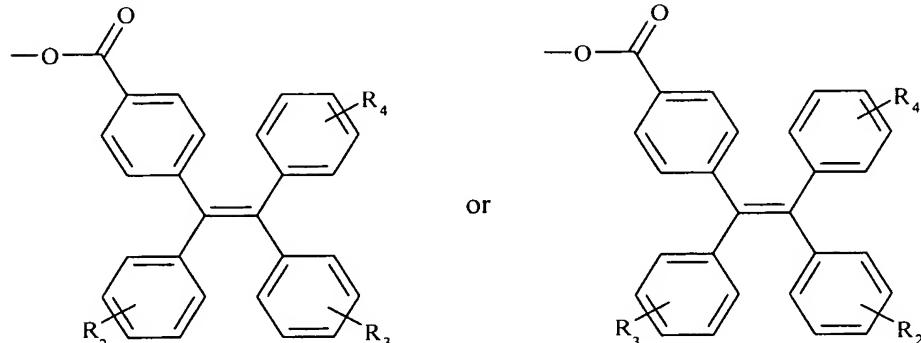
$R_2$  and  $R_3$ , preferably in para position, representing a hydrogen atom, a linear or branched, optionally functional alkyl group comprising from 1 to 30 carbon atoms, an optionally substituted and/or functional aryl group, comprising from 6 to 30 carbon atoms, a functional group, preferably a methoxy, mono-alkylamino, dialkylamino, 15 arylamino, cyano, ester, nitro, ketone, sulphonyl, alkylthio, sulphoxide group,

the functions  $F_0$  and  $F_1$  being as defined below:

–  $F_0$  corresponds to the following formula:



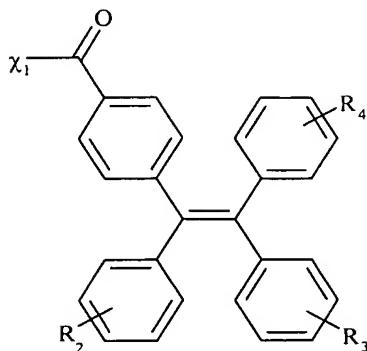
–  $F_1$  corresponds to one of the following formulae:



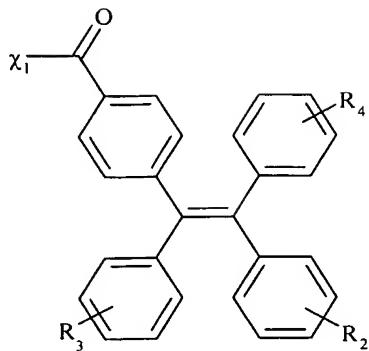
30  $R_2$ ,  $R_3$  and  $R_4$  being as defined above,

G corresponds to one of the following formulae:

5



or



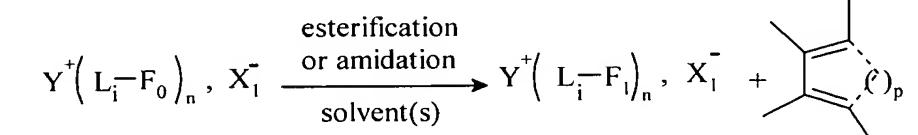
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$\chi_1$  representing an -OH group, or an -OR<sub>g</sub> group, R<sub>g</sub> representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

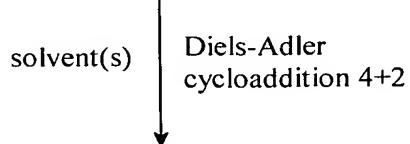
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**57. (new)** The method according to claim 31, wherein A<sub>1</sub><sup>+</sup> is a functional cation being able to be represented in the form Y<sup>+</sup>-L-F<sub>i</sub>, wherein Y<sup>+</sup>- corresponds to a cationic entity, optionally bound by means of an arm L to at least one function F<sub>i</sub>, F<sub>i</sub> varying from F<sub>0</sub> to F<sub>n</sub>, n being an integer varying from 1 to 10, for the implementation of cycloaddition reactions, preferably for the implementation of the Diels-Alder reaction, according to the following reaction diagram:

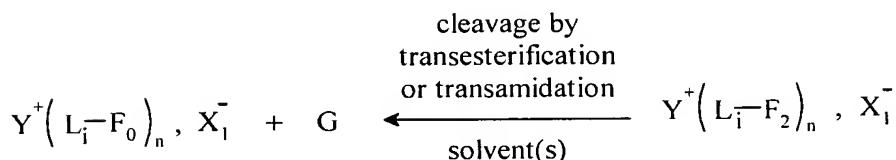
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25



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n being an integer varying from 2 to 4, as defined below,  
i being an integer varying from 1 to n,

p being an integer varying from 0 to 2,

Y<sup>+</sup> representing an onium cation, of formula (R<sub>b</sub>)<sub>x-n</sub>Λ<sup>+</sup> in which x represents an integer equal to 3 or 4, n being equal to 2, 3 or 4 when x is equal to 4 and n being equal to 2 or 3 when x is equal to 3, R<sub>b</sub> represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which Λ<sup>+</sup> represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y<sup>+</sup> representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

L<sub>i</sub> representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type (CH<sub>2</sub>)<sub>r</sub>, r varying from 1 to 20, and preferably from 2 to 10, the arms L<sub>i</sub> being able to be identical or different,

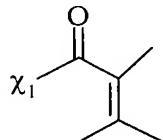
X<sub>1</sub><sup>-</sup> being as defined in claim 31, and being in particular Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, CF<sub>3</sub>CO<sub>2</sub><sup>-</sup>, CH<sub>3</sub>CO<sub>2</sub><sup>-</sup>, BF<sub>4</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, N(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, SO<sub>4</sub><sup>2-</sup>, R<sub>1</sub>SO<sub>4</sub><sup>-</sup>, SbF<sub>6</sub><sup>-</sup>, R<sub>1</sub>SO<sub>3</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>, R<sub>1</sub> representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F<sub>0</sub>, F<sub>1</sub> and F<sub>2</sub> being as defined below:

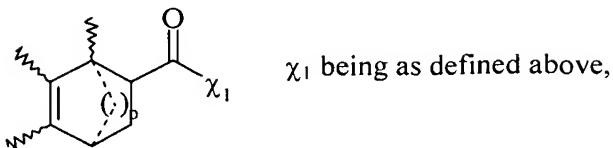
– F<sub>0</sub> corresponds to a -χ<sub>1</sub>H group, in which χ<sub>1</sub> represents an oxygen atom or an -NR<sub>f</sub> group, R<sub>f</sub> corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F<sub>1</sub> corresponds to the following formula:



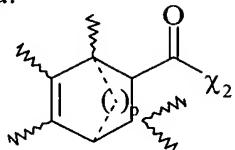
χ<sub>1</sub> being as defined above,

- $F_2$  corresponds to the following formula:



5

G corresponding to the following formula:



in which  $\chi_2$  represents either an  $OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

15       **58. (new)** The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+ - L - F_i$ , wherein  $Y^+ -$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10,  
 for the implementation of the Heck reaction, according to the following reaction diagram:

20 diagram:

$$Y^+ \left( L_i^- F_0 \right)_n , X_i^-$$

↓

solvent(s)      esterification or amidation

$$Y^+ \left( L_i^- F_1 \right)_n , X_i^-$$

25 solvent(s)      Heck reaction

$$\begin{array}{c} \chi_3 \\ | \\ T_5 - C = C - T_1 \\ | \\ T_4 - C = C - T_2 \\ | \\ T_3 \end{array}$$

30      cleavage      transesterification or transamidation

$$Y^+ \left( L_i^- F_2 \right)_n , X_i^- + G$$

n being an integer varying from 2 to 4,

i being an integer varying from 1 to n,

Y<sup>+</sup> representing an onium cation, of formula (R<sub>b</sub>)<sub>x-n</sub>Λ<sup>+</sup> in which x represents an integer equal to 3 or 4, n being equal to 2, 3 or 4 when x is equal to 4 and n being equal to 2 or 3 when x is equal to 3, R<sub>b</sub> represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which Λ<sup>+</sup> represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y<sup>+</sup> representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

L<sub>i</sub> representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type (CH<sub>2</sub>)<sub>r</sub>, r varying from 1 to 20, and preferably from 2 to 10, the arms L<sub>i</sub> being able to be identical or different,

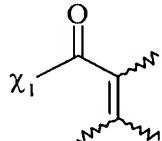
X<sub>1</sub><sup>-</sup> being as defined in claim 31, and being in particular Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, CF<sub>3</sub>CO<sub>2</sub><sup>-</sup>, CH<sub>3</sub>CO<sub>2</sub><sup>-</sup>, BF<sub>4</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, N(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, SO<sub>4</sub><sup>2-</sup>, R<sub>1</sub>SO<sub>4</sub><sup>-</sup>, SbF<sub>6</sub><sup>-</sup>, R<sub>1</sub>SO<sub>3</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>, R<sub>1</sub> representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F<sub>0</sub>, F<sub>1</sub> and F<sub>2</sub> being as defined below:

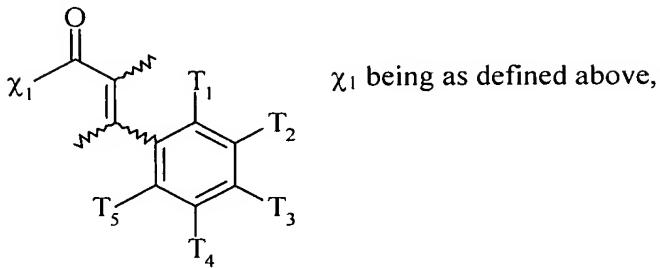
- F<sub>0</sub> corresponds to a -χ<sub>1</sub>H group, in which χ<sub>1</sub> represents an oxygen atom or an -NR<sub>f</sub> group, R<sub>f</sub> corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

- F<sub>1</sub> corresponds to the following formula:

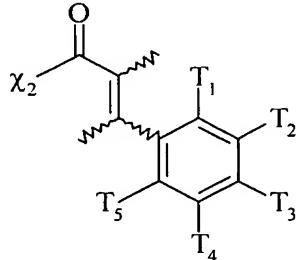


χ<sub>1</sub> being as defined above,

– F<sub>2</sub> corresponds to the following formula:



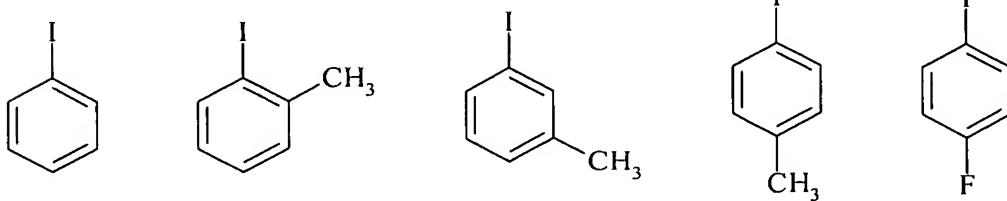
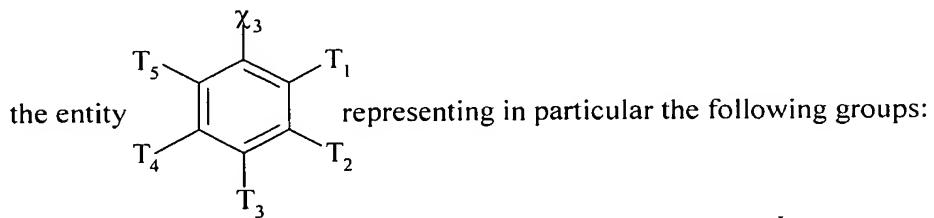
G corresponding to the following formula:

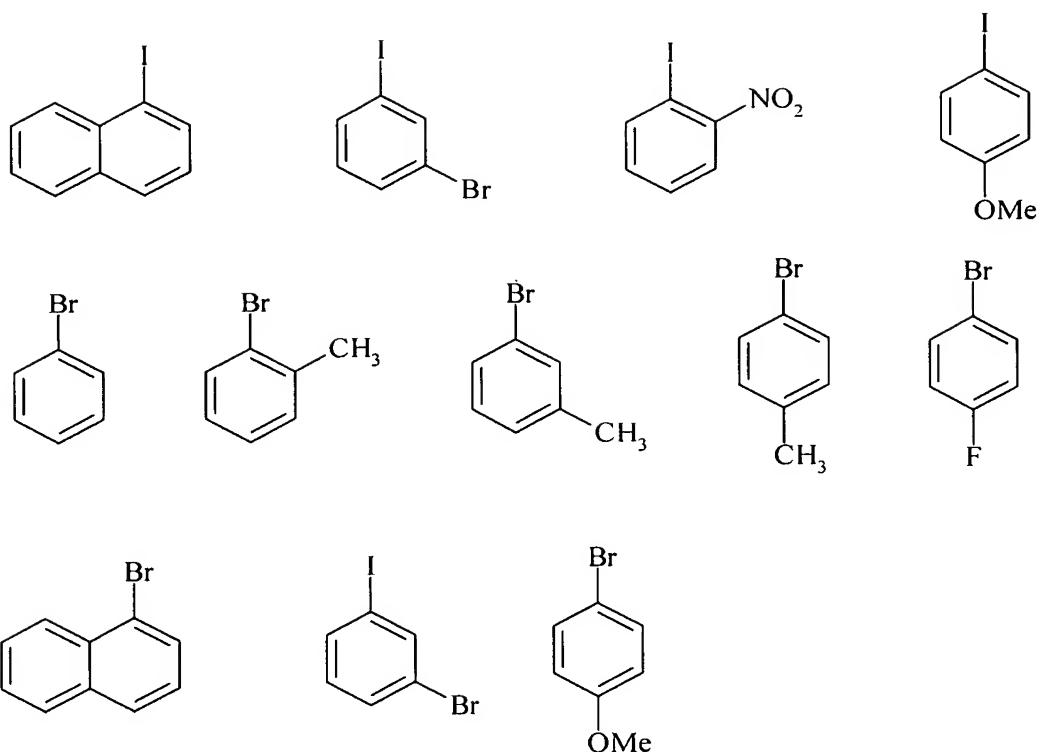


15 in which  $\chi_2$  represents either an -OR<sub>g</sub> group, R<sub>g</sub> representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an -NR<sub>h</sub>R<sub>u</sub> group, R<sub>h</sub> and R<sub>u</sub> representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

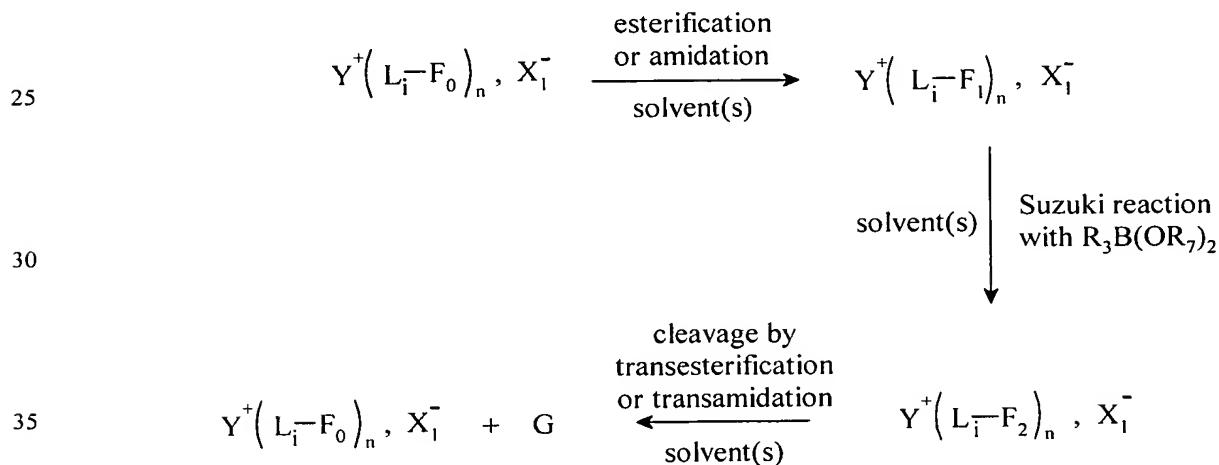
20  $\chi_3$  representing a leaving group, in particular chosen from the I, Cl and Br halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

25 T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> representing independently of one another a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a functional group in particular chosen from NO<sub>2</sub>, CN, COOR, OR, COR, NHCOR, NRR'', SO<sub>2</sub>R, I, Br, R and R'' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,





59. (new) The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+ - L - F_i$ , wherein  $Y^+$  corresponds to a 20 cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ ,  $n$  being an integer varying from 1 to 10,  
for the implementation of Suzuki coupling, according to the following reaction diagram:



$R_3$  being chosen from the substituted or non-substituted aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, comprising from 2 to 30 carbon atoms,

$R_7$  representing a hydrogen atom or a branched or linear alkyl group, or a cycloalkyl group comprising from 1 to 12 carbon atoms,

5         $n$  being an integer varying from 2 to 4,

$i$  being an integer varying from 1 to  $n$ ,

10       $Y^+$  representing an onium cation, of formula  $(R_b)_{x-n}\Lambda^+$  in which  $x$  represents an integer equal to 3 or 4,  $n$  being equal to 2, 3 or 4 when  $x$  is equal to 4 and  $n$  being equal to 2 or 3 when  $x$  is equal to 3,  $R_b$  represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which  $\Lambda^+$  represents an ammonium, imidazolium, phosphonium or sulphonium cation,  $Y^+$  representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

15       $L_i$  representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ ,  $r$  varying from 1 to 20, and preferably from 2 to 10, the arms  $L_i$  being able to be identical or different,

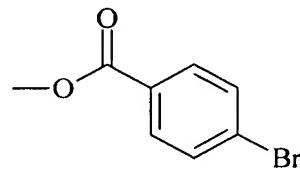
20       $X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

25      the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

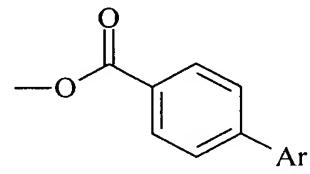
the functions  $F_0$ ,  $F_1$  and  $F_2$  being as defined below:

30      –  $F_0$  is in the form  $-\chi_1H$ ,  $\chi_1$  representing an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

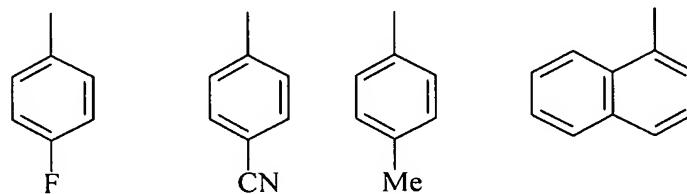
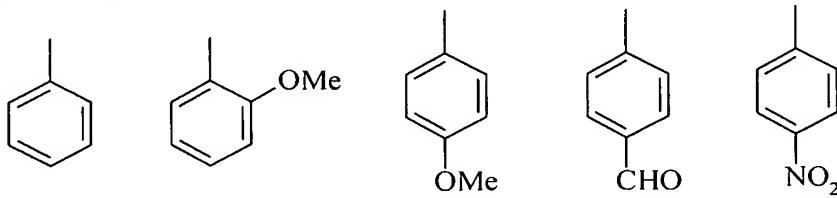
–  $F_1$  is in the form  $-R_e-\chi$ ,  $R_e$  representing an aromatic or heteroaromatic group comprising from 6 to 30 carbon atoms,  $\chi$  representing a leaving group preferably chosen from Cl, Br, I, OTf, O-CO<sub>2</sub>R<sup>5</sup> or OSO<sub>3</sub>-R<sup>5</sup>, R<sup>5</sup> representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms, F<sub>1</sub> preferably corresponding to the following formula:



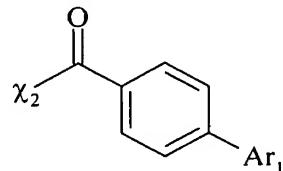
– F<sub>2</sub> is in the form  $-R_e-R_2$ , R<sub>e</sub> being as defined above and R<sub>2</sub> being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms, F<sub>2</sub> preferably corresponding to the following formula:



Ar<sub>1</sub> representing an aromatic group preferably chosen from:



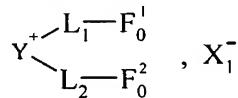
the molecule G being in the form R<sub>2</sub>-R<sub>3</sub>, R<sub>2</sub> and R<sub>3</sub> being as defined above, and corresponding in particular to the following formula:



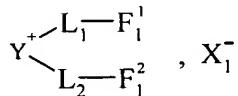
in which  $\chi_2$  represents either an  $-OR_g$  group,  $R_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-NR_hR_u$  group,  $R_h$  and  $R_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

5  $Ar_1$  is as defined above.

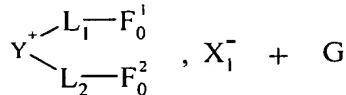
60. (new) The method according to claim 31, wherein  $A_1^+$  is a functional cation being able to be represented in the form  $Y^+ - L - F_i$ , wherein  $Y^+$  corresponds to a cationic entity, optionally bound by means of an arm L to at least one function  $F_i$ ,  $F_i$  varying from  $F_0$  to  $F_n$ ,  $n$  being an integer varying from 1 to 10,  
10 for the implementation of the Heck reaction, according to the following reaction diagram:



15 solvent(s)  $\downarrow$  esterification  
or amidation



20 solvant(s)  $\downarrow$  Heck reaction  
cleavage  $\downarrow$  transesterification  
or transamidation



25  $Y^+$  representing an onium cation, of formula  $(R_b)_{x-2}\Lambda^+$  in which  $x$  represents an integer equal to 3 or 4,  $R_b$  represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which  $\Lambda^+$  represents an ammonium, imidazolium, phosphonium or sulphonium cation,  $Y^+$  representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium  
30

cation,  $\Lambda^+$  representing an ammonium or phosphonium cation when  $x = 4$  and a sulphonium cation when  $x = 3$ ,

$L_1$  and  $L_2$ , identical or different, representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type  $(CH_2)_r$ ,  $r$  varying from 1 to 20, and preferably from 2 to 10,

$X_1^-$  being as defined in claim 31, and being in particular  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3CO_2^-$ ,  $CH_3CO_2^-$ ,  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $N(SO_2CF_3)_2$ ,  $SO_4^{2-}$ ,  $R_1SO_4^-$ ,  $SbF_6^-$ ,  $R_1SO_3^-$ ,  $FSO_3^-$ ,  $PO_4^{3-}$ ,  $R_1$  representing an alkyl group comprising from 1 to 20 carbon atoms,

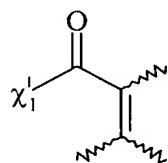
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions  $F_0^1$ ,  $F_1^1$ ,  $F_0^2$  and  $F_1^2$  being as defined below:

- $F_0^1$  corresponds to a  $-\chi_1^1H$  group, in which  $\chi_1^1$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

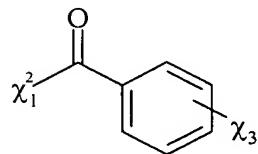
- $F_0^2$  corresponds to a  $-\chi_1^2H$  group, in which  $\chi_1^2$  represents an oxygen atom or an  $-NR_f$  group,  $R_f$  corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

- $F_1^1$  corresponds to the following formula:



$\chi_1^1$  being as defined above,

- $F_1^2$  corresponds to the following formula:

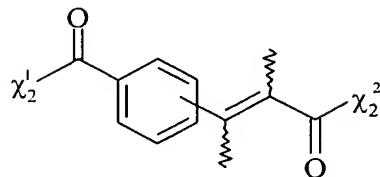


$\chi_1^2$  being as defined above, and

$\chi_3$  representing a leaving group, in particular chosen from the I, Cl and Br halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

G corresponding to the following formula:

5



10

in which  $\chi_2^1$  and  $\chi_2^2$ , identical or different, represent either an  $-\text{OR}_g$  group,  $\text{R}_g$  representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an  $-\text{NR}_h\text{R}_u$  group,  $\text{R}_h$  and  $\text{R}_u$  representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.